

SECTION 6.0

WASTEWATER DESCRIPTION AND PETITION IMPLEMENTATION AND COMPLIANCE

SASOL CHEMICALS (USA), LLC

2020 HWDIR EXEMPTION PETITION REISSUANCE REQUEST

SECTION 6.0 WASTEWATER DESCRIPTION AND PETITION IMPLEMENTATION AND COMPLIANCE

TABLE OF CONTENTS

6.0	WASTEWATER DESCRIPTION AND COMPLIANCE.....	6-1
6.1	WASTEWATER CHARACTERIZATION	6-1
6.1.1	Regulatory Characterization of the Wastewater Streams	6-1
6.1.2	Current Sources of Injected Wastewater	6-3
6.1.3	Hazardous Wastes Subject to Federal Land Ban Restrictions.....	6-3
6.1.4	Hazardous Wastes Not Subject to Federal Land Ban Restrictions.....	6-6
6.1.5	Waste Stream pH and Maximum Specific Gravity	6-6
6.1.6	Maximum Monthly Volume.....	6-7
6.1.7	Average and Maximum Rates of Injection.....	6-7
6.1.8	Patterns of Injection.....	6-8
6.1.9	Injection Well Checklist	6-8
6.2	WASTE MANAGEMENT	6-9
6.2.1	Active Class I Injection Well Summary	6-9
6.2.2	Injected Waste Summary.....	6-9
6.2.3	Containment of Hazardous Waste in the Injection Zone.....	6-10
6.3	IMPLEMENTATION AND COMPLIANCE	6-11
6.3.1	Storage Wastewater Flow, Collection and Storage	6-11
6.3.2	Monthly Injection Volume Compliance	6-12
6.3.3	Flow Allocation Implementation and Compliance.....	6-13
6.3.4	Specific Gravity Implementation and Compliance	6-14
6.3.4.1	Specific Gravity Measurement and Calculation	6-14

6.3.4.2 Cumulative Low Specific Gravity Waste Volume Limitation	6-15
6.3.5 Annual Pressure Monitoring and Compliance	6-15
6.3.6 Injection Interval Pressure Buildup Compliance.....	6-16
6.3.7 Injection Interval Transmissivity and Mobility Implementation and Compliance	6-16
6.3.8 Injected Constituent Implementation and Compliance	6-16

LIST OF FIGURES

- Figure 6-1 Location of Waste Treatment, Storage and Disposal Facilities
- Figure 6-2 Waste Storage and Pre-Injection Treatment System
- Figure 6-3 Time-series graph of daily and three-whole calendar month volume weighted average specific gravity measured at 20 °C (January 2001 through December 2018)

LIST OF TABLES

- Table 6-1 Waste Management Information
- Table 6-2 Average and Maximum Rates of Injection at the Sasol Chemicals (USA), LLC
Greens Bayou Plant
- Table 6-3 Injection Well Checklist
- Table 6-4 Modeled Maximum Pressure Increase at the Injection Wells
- Table 6-5 Modeled Inputs for the Annual Testing Demonstration

LIST OF APPENDICES

- Appendix 6-1 Sasol Chemicals (USA), LLC 2018 Waste Stream Analysis Report
- Appendix 6-2 Specific Gravity Measurement Procedures
- Appendix 6-3 Waste Stream Specific Gravity Compliance Program
- Appendix 6-4 Annual Well Pressure Transient Testing and Reporting Program

6.0 WASTEWATER DESCRIPTION AND COMPLIANCE

This section describes each of the waste streams currently being commingled and injected into Plant Wells Nos. 1 and 2 (WDW147 and WDW319). The average injection rate of the composite stream for the two injection wells is approximately +/-200 gpm. Typical operating range for the composite injected waste stream composition is shown in Appendix 6-1.

Section 6.3 Implementation and Compliance describes the facility protocols for complying with Petition Approval Conditions, including the measurement of the three whole-calendar month running specific gravity of the injected waste stream. Additionally, a protocol is developed for complying with monitoring of the injection interval(s) and specified injection rate limitations that result from approval from this 2020 HWDIR Exemption Petition Reissuance.

6.1 WASTEWATER CHARACTERIZATION

6.1.1 Regulatory Characterization of the Wastewater Streams

The injected waste stream is a composite of several major process streams and consists of an aqueous caustic solution with detectable quantities of organic and inorganic constituents. Sasol Chemicals (USA), LLC purchases crude cresylic acids from coal tar processing plants and coal gasification plants as raw materials to produce phenol, cresols, xylenols, blends of cresylic acids, and sodium carbonate solution. The plant processes are divided into five process groups:

- 1) Raw Material Processing;
- 2) Intermediate Cresylic Acid;
- 3) Finished Cresylic Acid Processing;
- 4) Batch Processing; and
- 5) Transfer Operations

The sources of the effluent are generated from current plant operations. The wastewater stream is an aqueous salt solution with detectable quantities of organic and inorganic chemicals. Radioactive wastes have not and will not be generated or injected at the facility.

The stream is regulated as characteristic liquid hazardous waste due to the presence of several toxic organic constituents in the stream, listed in the promulgated Toxicity Characteristic (TC) Rule [40 CFR 261 et al., 55 Red. Reg. 11798 (March 29, 1990)]. These streams are hazardous under 40 CFR 261.24 based on the presence of o-cresol, m-cresol, p-cresol, and have EPA Hazardous Waste Numbers D023, D024, D025, D026. The acid and sodium salt forms of the cresol isomers are shown under the chemical characteristics because both forms exist in equilibrium in the alkaline solution. The actual amounts of each of the two forms in equilibrium depend upon the pH of the solution.

Industrial waste permitted for injection at the Sasol Chemicals (USA), LLC Greens Bayou Plant consists of the following (see Appendix 1-1):

Industrial hazardous and nonhazardous waste shall consist solely of the following waste streams:

1. Waste streams generated from plant operations and generated from off-site operations at facilities owned by the owner/operator.
2. Waste streams generated from offsite operations at facilities not owned by the owner/operator which are compatible with permitted waste streams, injection zone and well materials.
3. Other associated wastes such as groundwater and rainfall contaminated by the above authorized wastes, spills of the above authorized wastes, and wash waters and solutions used in cleaning and servicing the waste disposal well system equipment which are compatible with the permitted waste streams, injection zone and well materials.

4. Waste generated during well construction or closure of WDW147 and WDW319, and associated facilities that are compatible with permitted wastes, injection zone, and well materials.

6.1.2 Current Sources of Injected Wastewater

The sources and volumes of the effluent injected at the Greens Bayou Plant are provided in Table 6-1. Figure 6-1 presents a plat map of the facility and Figure 6-2 presents a simplified process flow diagram.

Raw materials are received at the Greens Bayou Plant by barge, rail tank car, and tank truck. Major raw materials received from suppliers are: Crude Cresylic Acid, Sulfidic Caustic,

The sources of the effluent are generated from current plant operations of processing the raw materials. The waste stream is ultimately collected in a single filtered water storage tank (T-605) from which waste stream is pumped through an additional set of filters and fed to the deep wells for disposal. The composite stream can be discharged from Tank T-605 to either or both wells. However, currently only Plant Well No. 2 (WDW319) is on active status. Radioactive wastes have not and will not be generated or injected at the facility.

6.1.3 Hazardous Wastes Subject to Federal Land Ban Restrictions

Under the Hazardous Waste Disposal Injection Restrictions regulations promulgated by the Environmental Protection Agency (EPA), 40 CFR Part 148, 53 Fed. Reg. 28117 (July 26, 1988), the continued injection of any waste identified as a "hazardous waste" under EPA's Resource Conservation and Recovery Act (RCRA) regulations would be prohibited unless the waste meets an EPA-specified treatment standard, or EPA approves a petition demonstrating, to a reasonable degree of certainty, that continued waste injection will be protective of human health and the environment for as long as the waste remains hazardous. Subsection 148.20(a)(1)(i) of the regulations provides that such a demonstration may be made on the basis of a scientific analysis showing that the injected fluids will not migrate vertically upward out of the Injection Zone, or

laterally within the Injection Zone to a point of discharge, or interface with an Underground Source of Drinking Water (USDW) within a period of 10,000 years.

A petition providing data and analysis sufficient under promulgated subsection 148.20(a)(1)(i) to demonstrate that continued injection of wastewater at the SASOL Chemicals (USA), LLC Greens Bayou Plant will be protective of human health and the environment for as long as the waste remains hazardous was approved by EPA on December 2, 1994. The approval currently covers the following EPA hazardous waste numbers: D002, D003, D018, D021, D023, D024, D025, D026, D038, U012, U018, U019, U022, U037, U050, U052, U063, U070, U071, U072, U101, U120, U137, U165, U188, U196, U220, U239, F002, F005, and F039.

For protective purposes and to cover potential future uses of the injection wells, SASOL Chemicals (USA), LLC was approved in the 2000 HWDIR Exemption Petition Reissuance that all applicable EPA hazardous waste numbers identified and listed in 40 CFR 261 Subpart C and 40 CFR 261 Subpart D be added to the exemption, including: 1) all characteristic D waste numbers (ignitability, corrosivity, reactivity, and toxicity); 2) all hazardous wastes from non-specific sources (F waste numbers); 3) all hazardous wastes from specific sources (K waste numbers); and 4) all hazardous wastes from discarded commercial chemical products, off-specification species, manufacturing chemical intermediates, container residues, and spill residues (P and U waste numbers). The EPA Exemption Petition Reissuance was approved on June 28, 2006.

The collective EPA Hazardous Waste Codes, including those requested in this reissuance, are tabulated below:

D Codes	D001, D002, D003, D004, D005, D006, D007, D008, D009, D010, D011, D012, D013, D014, D015, D016, D017, D018, D019, D020, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D031, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, D042, D043
---------	--

F Codes	F001, F002, F003, F004, F005, F006, F007, F008, F009, F010, F011, F012, F019, F020, F021, F022, F023, F024, F025, F026, F027, F028, F032, F034, F035, F037, F038, F039
K Codes	K001, K002, K003, K004, K005, K006, K007, K008, K009, K010, K011, K012, K013, K014, K015, K016, K017, K018, K019, K020, K021, K022, K023, K024, K025, K026, K027, K028, K029, K030, K031, K032, K033, K034, K035, K036, K037, K038, K039, K040, K041, K042, K043, K044, K045, K046, K047, K048, K049, K050, K051, K052, K061, K062, K069, K071, K073, K083, K084, K085, K086, K087, K088, K093, K094, K095, K096, K097, K098, K099, K100, K101, K102, K103, K104, K105, K106, K107, K108, K109, K110, K111, K112, K113, K114, K115, K116, K117, K118, K123, K124, K125, K126, K131, K132, K136, K141, K142, K143, K144, K145, K147, K148, K149, K150, K151, K156, K157, K158, K159, K161, K169, K170, K171, K172, K174, K175, K176, K177, K178, K181
P Codes	P001, P002, P003, P004, P005, P006, P007, P008, P009, P010, P011, P012, P013, P014, P015, P016, P017, P018, P020, P021, P022, P023, P024, P026, P027, P028, P029, P030, P031, P033, P034, P036, P037, P038, P039, P040, P041, P042, P043, P044, P045, P046, P047, P048, P049, P050, P051, P054, P056, P057, P058, P059, P060, P062, P063, P064, P065, P066, P067, P068, P069, P070, P071, P072, P073, P074, P075, P076, P077, P078, P081, P082, P084, P085, P087, P088, P089, P092, P093, P094, P095, P096, P097, P098, P099, P101, P102, P103, P104, P105, P106, P108, P109, P110, P111, P112, P113, P114, P115, P116, P118, P119, P120, P121, P122, P123, P127, P128, P185, P188, P189, P190, P191, P192, P194, P196, P197, P198, P199, P201, P202, P203, P204, P205
U Codes	U001, U002, U003, U004, U005, U006, U007, U008, U009, U010, U011, U012, U014, U015, U016, U017, U018, U019, U020, U021, U022, U023, U024, U025,

	U026, U027, U028, U029, U030, U031, U032, U033, U034, U035, U036, U037, U038, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U055, U056, U057, U058, U059, U060, U061, U062, U063, U064, U066, U067, U068, U069, U070, U071, U072, U073, U074, U075, U076, U077, U078, U079, U080, U089, U090, U091, U092, U093, U0, U1,94, U095, U096, U097, U098, U099, U101, U102, U103, U105, U106, U107, U108, U109, <u>U110</u> , U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U13, U134, U135, U136, U137, U138, U140, U141, U142, U143, U144, U145, U146, U147, U148, U149, U150, U151, U152, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U163, U164, U165, U166, U167, U168, U169, U170, U171, U172, U173, U174, U176, U177, U178, U179, U180, U181, U182, U183, U184, U185, U186, U187, U188, U189, U190, U191, U192, U193, U194, U196, U197, U200, U201, U202, U203, U204, U205, U206, U207, U208, U209, U210, U211, U213, U214, U215, U216, U217, U218, U219, U220, U221, U222, U223, U225 U226, U227, U228, U234, U235, U236, U237, U238, U239, U240, U243, U244, U246, U247, U248, U249, U271, U278, U279, U280, U353, U359, U364, U367, U372, U373, U387, U389, U394, U395, U404, U409, U410, U411
--	---

6.1.4 Hazardous Wastes Not Subject to Federal Land Ban Restrictions

The Sasol Greens Bayou Plant has listed all potential restricted hazardous wastes subject to the federal land ban restrictions in Section 6.1.3 of this application. The Greens Bayou Plant does not inject any hazardous wastes that are not subject to federal land ban restrictions.

6.1.5 Waste Stream pH and Maximum Specific Gravity

The pH of the injected waste stream will not be less than 4.5 standard units. The specific gravity of the effluent stream is expected to run between values of 1.000 to 1.200 at 60° C. The

maximum specific gravity value of 1.100 has been used in the applicable engineering analyses in this application.

PARAMETER	PERMITTED LIMITATION
pH	> 4.5 standard units
Maximum Specific Gravity (at 60 °F)	≤ 1.200

6.1.6 Maximum Monthly Volume

Modeling included in Section 3.0 – Flow and Containment considers the use of maximum injection volumes into each separate injection interval. Therefore, the Greens Bayou Plant is requesting a maximum monthly volume equivalent to 750 gpm be set in the Frio E&F Sand Injection Interval, and a maximum monthly volume equivalent to 750 gpm be set in the Frio A/B/C Sand Injection Interval. The Greens Bayou Plant further requests that the maximum monthly volumes of injection be cumulative in each interval, should the injection wells be completed into the same or portions of the same injection interval.

INJECTION INTERVAL	MAXIMUM MONTHLY VOLUME (GALLONS)
Frio E&F Sand	750 gpm * 1,440 minutes per day * Days in Month
Frio A/B/C Sand	750 gpm * 1,440 minutes per day * Days in Month

* Cumulative all wells in that interval

6.1.7 Average and Maximum Rates of Injection

The Greens Bayou Plant anticipates that average daily flow to the injection wells will continue to be approximately 330,600 gallons per day (230 gpm). This equates to an average cumulative monthly volume of 10,062,637 gallons (30.4375 standard days per month) and an annual average cumulative volume of 120,751,650 gallons (365.25 standard days per year). Interval average volumes in the Frio E&F Sand Injection Interval and the Frio A/B/C Sand Injection Interval are shown in Table 6-2.

Modeling presented in Section 3.0 – Flow and Containment - considers significantly higher rates of injection (750 gpm) for each of the two main injection intervals (Frio E&F Sand Injection Interval and the Frio A/B/C Sand Injection Interval) than is currently being injected on a daily basis (approximately 230 gpm). Interval maximum volumes in the Frio E&F Sand Injection Interval and the Frio A/B/C Sand Injection Interval are shown in Table 6-2.

6.1.8 Patterns of Injection

Injection Well No. 1 (WDW147) was completed only in the Frio E&F Sand and Plant Well No. 2 (WDW319) only completed in the Frio A/B/C Sand Injection Interval. Since 2000, Injection Well No 1 (WDW147) has been on standby status and not used for injection. Total cumulative volume of injection into the Frio E&F Sand Injection Interval is approximately 2.178 billion gallons since 1979. Plant Well No. 2 (WDW319) is currently injecting into the Frio A/B/C Sand Injection Interval, with a cumulative injected volume of approximately 1.510 billion gallons since 2000 through year end 2018.

6.1.9 Injection Well Checklist

A listing of the facility injection wells is shown in Table 6-3. The table includes the status and design capacity for each injection well

6.2 WASTE MANAGEMENT

The Greens Bayou Plant has two existing underground injection control permits: WDW147 (Plant Well No. 1) and WDW319 (Plant Well No. 2). Injection of waste is currently only into the Frio A/B/C Sand Injection Interval through WDW319 (Plant Well No. 2). WDW147 (Plant Well No.1) has been placed on standby status and has not injected into the Frio E&F Sand Injection Interval since 2000.

6.2.1 Active Class I Injection Well Summary

A listing of the two active facility injection wells is shown in Table 6-3. The table includes the status, historical volumes, injection capacity, and startup and years of service for the two wells, and design capacity for each well.

6.2.2 Injected Waste Summary

Section 6.1.1 provides summaries of the process waste streams presently injected in the wells. The injected waste stream is a composite of several major process streams and consists of an aqueous caustic solution with detectable quantities of organic and inorganic constituents. Prior to the promulgation of the Toxicity Characteristic (TC) rule in 1990, the injected waste stream was regulated as a characteristic hazardous waste due to corrosivity and reactivity. Following the promulgation of the TC rule in 1990, a new list of hazardous wastes was created that are dependent upon the concentration of organic constituents in the leachate from the waste, and the list of wastes being injected expanded accordingly. These wastes are subject to the EPA's Land Disposal Restrictions (LDR) and through the Hazardous Waste Disposal Injection Restriction (HWDIR) Exemption Petition process, The Greens Bayou Plant has been granted permission to inject these waste streams (see Section 6.1.4).

The Greens Bayou Plant has the permitted capacity to inject 394,200,000 gallons of wastewater per year, per a well, when each well is completed in a separate injection interval. However, if both wells are completed in a common sand package, the volume of wastewater will not exceed 33,480,000 gallons per a month (or 394,200,000 gallons per a year per an Injection Interval Sand). Because all the wastewater is commingled prior to injection, the wastewater potentially

carries all the waste codes listed in Section 6.1.3.

The Greens Bayou Plant has a program in place designed to reduce the volume and toxicity of on-site generated wastes to the degree that is determined to be economically and practicably feasible. It is also the position of the Greens Bayou Plant that deep well injection of these wastes presents an environmentally sound method of disposal and minimizes the present and future threat to human health and the environment.

6.2.3 Containment of Hazardous Waste in the Injection Zone

No releases are suspected to have occurred or are occurring from either injection well.

Shales immediately overlying the Injection Intervals contained within the Frio Formation Injection Zone, form effective barriers to vertical fluid movement. The middle Frio is shale prone, only containing thin, discontinuous fluvial sands. Net shale, as measured from well logs in the interval between the top of the Frio E Sand Injection Interval and the top of the Frio Injection Zone (i.e., the Frio Containment Interval), shows that there is an approximate 400 feet of net shale in the area surrounding the plant site. This shale thickness is more than adequate to contain vertical permeation of fluids from the injection intervals over the operational life of the wells.

Annual mechanical integrity testing and 5-year testing of the wells demonstrates that the injected wastes are contained within the Frio Injection Zone.

6.3 IMPLEMENTATION AND COMPLIANCE

This section specifically addresses implementation and compliance issues as they relate to petition approval conditions regarding waste density and flow rate limitations. The following section is included in this 2020 Hazardous Waste Disposal Injection Restrictions (HWDIR) Exemption Petition Reissuance for the Channelview site.

Information included in this section describes the facility protocol for measuring specific gravity of the injected waste stream. Additionally, a protocol is developed for complying with injection rate limitations that result from approval from this 2020 HWDIR Exemption Petition Reissuance.

6.3.1 Storage Wastewater Flow, Collection and Storage

The pre-injection disposal well facility contains miscellaneous equipment including Tank #605, Tank #362027, Tank #362038, piping, pumps, storage bins, the pressure leaf filters (F-603 and F-604), and the pre-injection filtration system (Figure 6-2)

Waste process brine (TCEQ NOR #005410H) from the manufacturing process is pumped to storage Tanks #362027 and/or #362028. Under normal operating conditions, primary filter (either F-603 or F-604) is online while the other is down for cleaning. The unfiltered brine is fed directly to the primary filters from the storage tanks. The primary filters use a set of cartridge filters to remove solids from the waste process brine. The filtered waste from the primary filter passes through a second bank of cartridge filters (F-605 and F-606) and is collected in the filtered water storage tank (T-605). From storage tank T-605, the water is pumped through an additional set of filters and fed to either of the deep wells for disposal. NOTE: only Plant Well No. 2 (WDW319) is currently in service.

A primary filter is shut down for cleaning based on either a predetermined maximum differential pressure or a maximum on-stream run time. Upon shutdown, the filter is water washed to remove contained liquids and then purged with the filter air blower. The filter is then opened and cleaned. Spent filters are dropped into the storage bins located beneath the filters for disposal to

an offsite commercial waste disposal site. The secondary and tertiary filters use similar cartridge filters and once spent, are placed into a storage bin for offsite disposal.

A simplified sketch showing the major elements in the well system is shown in Figure 6-2 (Plant Drawing 75-2013). Detailed drawing of the system can be found on the system P&IDs maintained at the Greens Bayou Plant. Samples are normally taken after F-607/F-608/F-609, but connections exist at various other points in the system for use if needed.

6.3.2 Monthly Injection Volume Compliance

The Sasol Chemicals (USA), LLC Greens Bayou Plant is requesting that a monthly volume limitation in each injection interval based on the following be included as Petition Approval Condition Number 2.

- The requested cumulative monthly injection volume limit in the Frio E&F Sand Injection Interval (current completion interval for Plant Well No. 1 (WDW147)) and is set to equal that volume calculated by multiplying the following: (the maximum cumulative injection rate of 750 gpm) x (1,440 minutes per day) x (number of days in that month) inclusive for all operating wells completed into the interval.
- The requested cumulative monthly injection volume limit in the Frio A/B/C Sand Injection Interval (current completion interval for Plant Well No. 2 (WDW319)) is set to equal that volume calculated by multiplying the following: (the maximum cumulative injection rate of 750 gpm) x (1,440 minutes per day) x (number of days in that month) inclusive for all operating wells completed into the interval.

Total flow to Plant Well No. 1 (WDW147) and Plant Well No. 2 (WDW319) is measured using a Coriolus – type mass meter, which continuously measures flow rate, temperature, and mass density (see Appendix 6-2). Flow rate measurement is not significantly affected by waste viscosity or temperature. Flow is totaled by the process logic controller (GE9030 processor). After the total flow to the two wells is totaled via the mass density meter, flow can be diverted to

either well, or to both wells, using manual block valves. Total flow for each of the two wells is reported monthly to the TCEQ.

6.3.3 Flow Allocation Implementation and Compliance

Plant Well No. 1 (WDW147) is perforated into the Frio E&F Sand only. Since this well is completed into a single interval, it doesn't matter how the flow is currently apportioned in the in the Plant Well No. 1 (WDW147), since 100 percent of the flow is into the Frio E&F Injection Interval Sand, and the well is currently limited by permit to a 750 gpm maximum injection rate.

Plant Well No. 2 (WDW319) is perforated into the Frio A&B and the Frio C Sand and the well is limited by permit to 750 gpm maximum injection rate. For purposes of this reissuance, these sands are considered as a "commingled" unit (defined as the Frio A/B/C Sand Injection Interval). From a demonstration standpoint, the Frio A/B/C Sand Injection Interval is conservatively modeled for both pressure build-up and plume transport. Therefore, it doesn't matter how the flow is apportioned in Plant Well No. 2 (WDW319).

However, each well is constructed such that the Frio A&B and/or the Frio C Sand can be perforated in Plant Well No. 1 (WDW147), and that the Frio E&F Sand can be perforated in Plant Well No. 2 (WDW319). Either one of these scenarios may will reduce the maximum injection rate per the well. The TCEQ permit also limits the maximum injection rate into a sand interval at 750 gpm if more than 1 well is completed in a common sand package.

Experience with the onsite injection wells indicates that radioactive tracer tool velocity shots are the most accurate for determining flow allocation, especially with the large diameter protection casing strings in Plant Well No. 1 (WDW147) and Plant Well No. 2 (WDW319). Sasol has performed informational flow profiling during mechanical integrity testing of Plant Well No. 2 (WDW319). The procedures outlined in Appendix 6-4 will be used as a template for future flow profile testing, if compliance is required for one or more of the wells in the future.

Generally, any measurement, including downhole flow measurements, includes some margin of error. This error will be considered and included within the implementation and compliance monitoring of flow allocation for wells completed in more than one injection interval.

Results of the two-rate velocity show flow profiles (with error assessment) will be combined in order to determine the flow allocation percent. It is possible that the total flow allocation tracked in the injection intervals could exceed percent of the well injection rate.

6.3.4 Specific Gravity Implementation and Compliance

6.3.4.1 Specific Gravity Measurement and Calculation

Specific gravity measurement equipment and procedures employed at the Sasol Chemicals (USA), LLC Greens Bayou Plant are included in Appendix 6-2. The procedures show a measurement at a temperature of 20°C, which is the reference temperature used in this 2020 HWDIR Exemption Petition Reissuance request and previously approved in the 2000 HWDIR Exemption Petition Reissuance request as Condition No. 4. Since the injection stream to the injection wells is a single composite the filtered water storage tank (T-605), sampling of each individual process stream is not required. Specific gravity will continue to be measured at least once per day. A waste stream specific gravity program is contained in Appendix 6-3.

A three-whole calendar month volume weighted average specific gravity will be calculated by Sasol Chemicals (USA), LLC Greens Bayou Plant to maintain compliance with the requested specific gravity range. Sample calculations for the three-whole calendar month volume weighted average specific gravity (time period from August 2001 to December 31, 2018) are tabulated in Appendix 6-3. The three-whole calendar month volume weighted average specific gravity is calculated by determining the individual monthly volume weighted average specific gravity. This is accomplished as shown in the procedure defined in Appendix 6-3. In the sample calculation, the reference three-month base period is set from January through March 2018, with the three-whole calendar month volume weighted average specific gravity calculated starting at the end of March 2018. For each subsequent month, starting from April 2018 through December

31, 2018, the running average is recalculated, adding the subsequent month's value and dropping the first month's value.

The calculation example for the time period from January 2001 through December 2018 is shown in Figure 6-3. This figure demonstrates that the facility has and can maintain compliance with the requested range of specific gravities.

Separate calculation spreadsheets will be maintained for each active injection interval.

6.3.4.2 Cumulative Low Specific Gravity Waste Volume Limitation

The long-term Low Specific Gravity Waste Plume demonstration is based on site injection of no more than 3.945 billion gallons of low specific gravity waste between the beginning of 2018 to year-end 2050. For purposes of tracking, Sasol will define "Low Specific Gravity Waste" as the total volume of waste injected each month when the volume weighted specific gravity for that month falls below a specific gravity of 1.091 at 20°C. Sasol will track both the annual and site volume of low specific gravity waste injected starting January 1, 2018. These volumes will be reported and compared to the conditioned volume limitation in the annual mechanical integrity and bottomhole pressure test report for the two injection wells.

6.3.5 Annual Pressure Monitoring and Compliance

Annual pressure monitoring will be conducted in the active injection intervals as detailed in the procedures outlined in Appendix 6-4. At a minimum, Sasol Chemicals (USA), LLC will run a bottomhole pressure survey for each active injection interval, alternating annually between available wells completed in each active injection interval. The survey for each active interval will be performed after shutting in the injection test well for a period of time sufficient to conduct a valid observation of the pressure falloff curve, in accordance with 40 CFR §146.68(e)(1).

6.3.6 Injection Interval Pressure Buildup Compliance

A methodology for calculating the threshold pressures for the Cone of Influence and for critical Artificial Penetrations requiring further evaluation is described and summarized in Section – Area of Review. These computations show that the conservatively predicted model pressure increase with time (Section 2.0) does not exceed conservatively calculated minimum allowable threshold pressures. Therefore, pressure increase at the injection wells can be effectively monitored during annual injection/falloff testing to ensure compliance with injection interval pressure build-up. The model predicted maximum pressure increase in the defined injection intervals is shown in Table 6-4. Results from this table indicate that compliance is maintained in the Frio E&F Sand Injection Interval at a flowing bottomhole pressure (corrected for well skin effects) not to exceed 3,107.8 psi at a reference depth of 6,548 feet bgl in Plant Well No. 1 (WDW147). Compliance is also maintained in the Frio A/B/C Sand Injection Interval at a flowing bottomhole pressure (corrected for well skin effects) not to exceed 3,451.4 psi at a reference depth of 6,820.5 feet bgl in Plant Well No. 2 (WDW319). Annual bottomhole pressure falloff testing results will be compared to the model predicted values in Section 3.0.

6.3.7 Injection Interval Transmissivity and Mobility Implementation and Compliance

Injection interval transmissivity (md-ft/cp) and mobility (md/cp) will be monitored annually by performing an injection falloff test in each active injection interval (or an injection/falloff test followed by an interference test to confirm communication, if more than one well is completed in the same injection interval (see Appendix 6-4)). The results of the annual testing will be compared to the model values used in the Flow and Containment Modeling (Section 3.0). For the injection intervals the following values are used in this demonstration see Table 6-5.

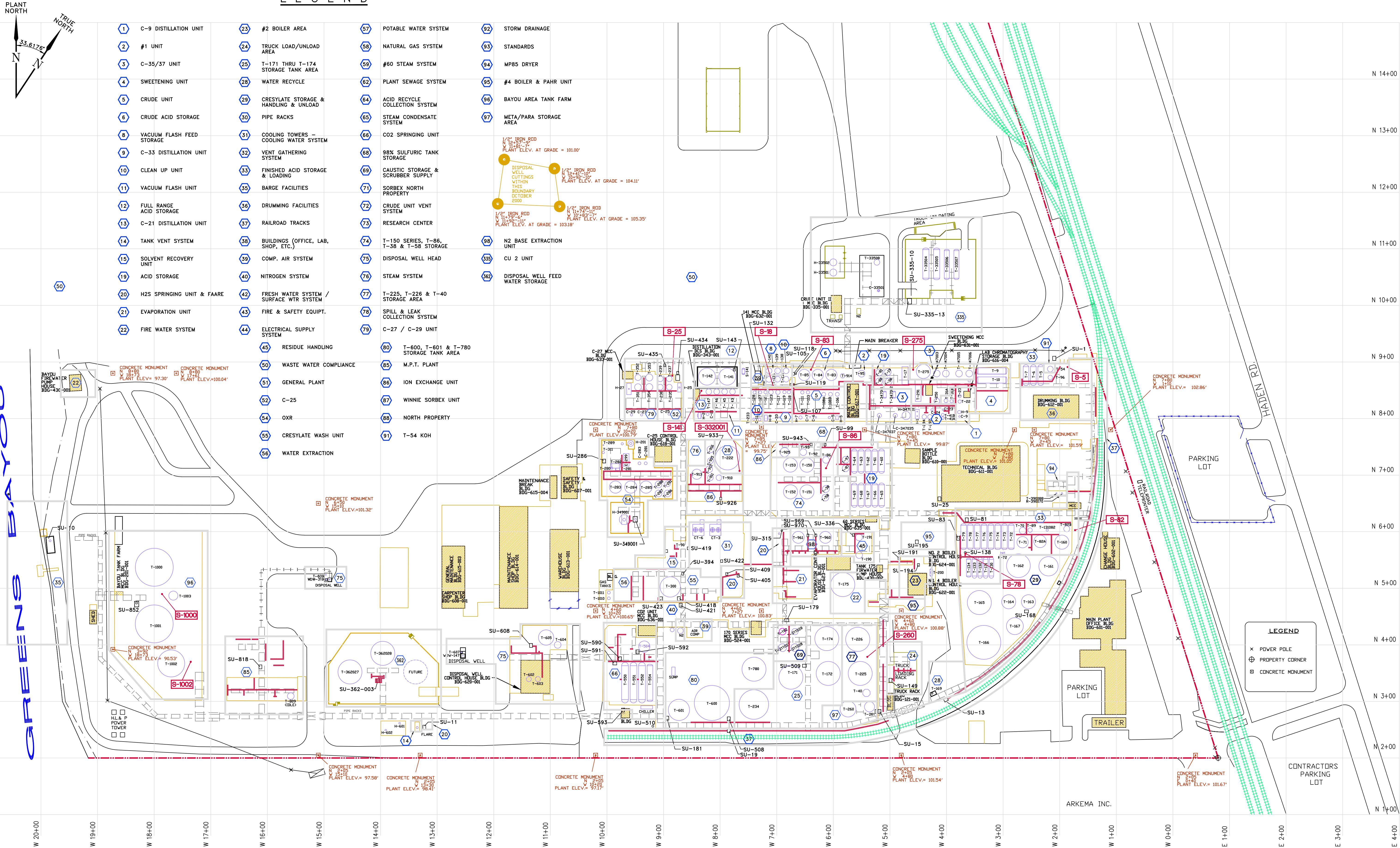
6.3.8 Injected Constituent Implementation and Compliance

The limiting concentration reduction factor is set to 1×10^{-6} for the constituents of concern, which encompass the requested EPA hazardous waste numbers included in this reissuance (see Section 3). For the majority of the requested constituents, this value is overly conservative, as the constituents can be theoretically injected at a wellhead concentration at 1,000,000 milligrams

per liter (mg/l), without approaching or exceeding the 1×10^{-6} limiting concentration reduction factor. This determination is based on a review of the Land Ban Health Based Limits and/or Detection Limits set in EPA Region 6's Land Ban Health Based Guideline (revised) dated April 25, 2005 (see Appendix 3-6, Key References, located in Appendix 3-6). However, a limited set of constituents must be monitored, since their Land Ban Health Based Limit and/or Detection Limit is lower than a corresponding concentration reduction factor value of 1×10^{-6} . Therefore, it is theoretically possible for these select constituents to exceed the limiting concentration reduction factor at the wellhead, if they are injected at sufficiently high concentrations. As shown in Appendix 6-1, the Greens Bayou Plant tabulates the annual waste stream analyses and compares the concentrations to the "Maximum Waste Stream Concentrations" used in the petition modeling. The table in Appendix 6-1 is updated annually. This ensures that the identified constituents of concern do not exceed the maximum wellhead concentrations identified in Section 3.4.11.3.

FIGURES

LEGEND



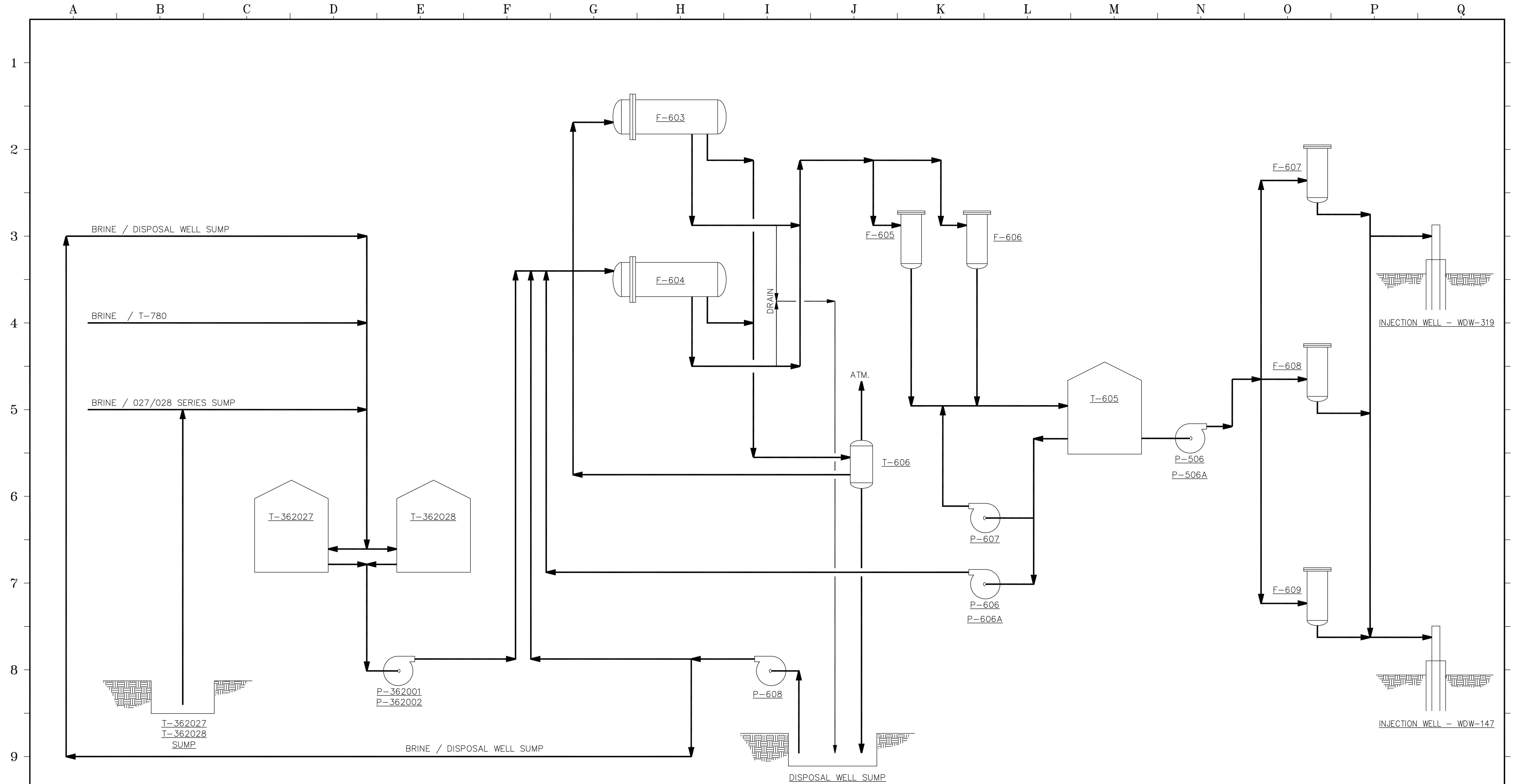


Figure 6-2

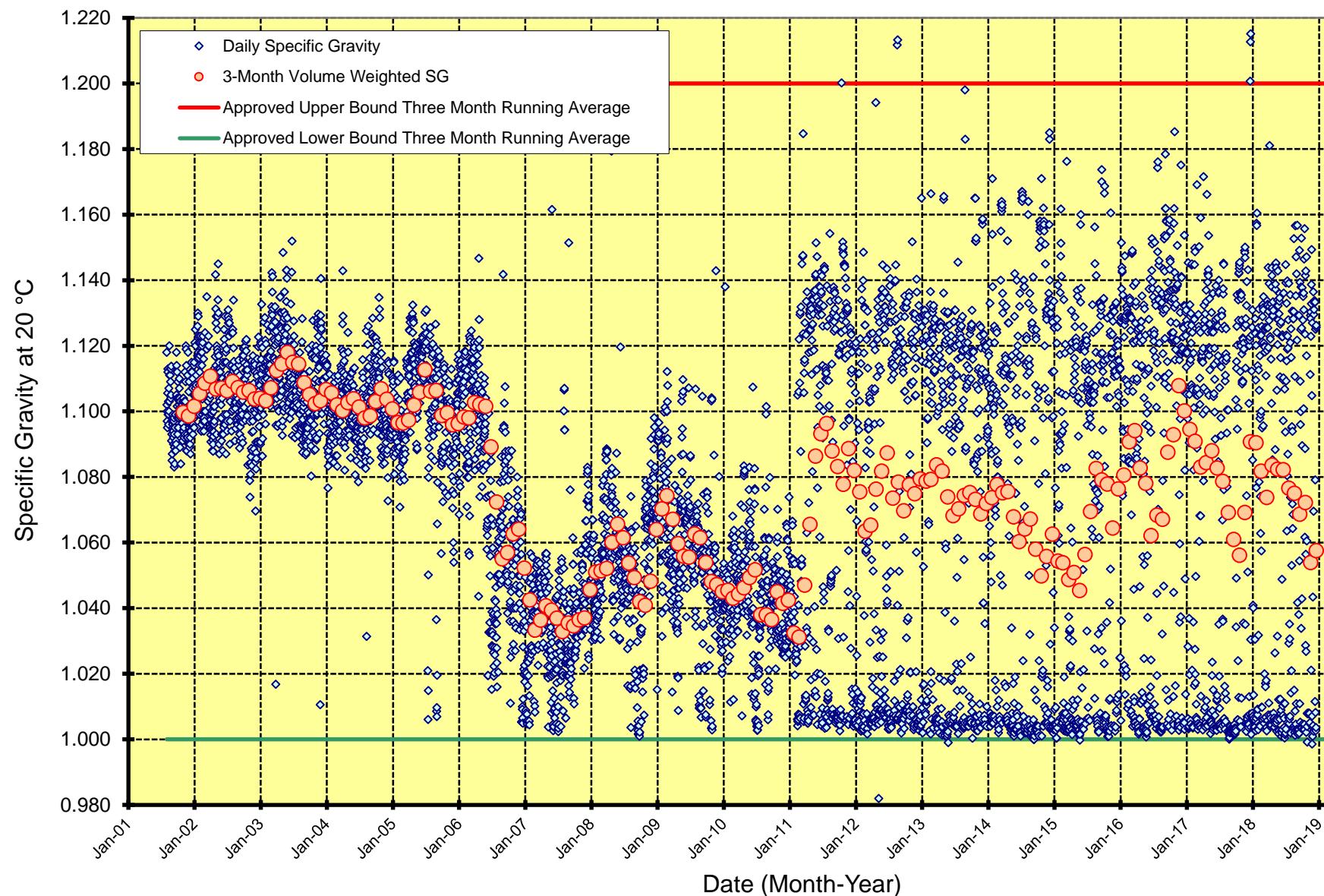


Figure 6-3 Time-series graph of twice daily and three-whole calendar month weighted average specific gravity measured at 20C

Geostock Sandia, LLC

TABLES

TABLE 6-1
WASTE MANAGEMENT CHECKLIST

WASTE	SOURCE	VOLUME (gallons/year)
Waste Process Brine	On Site	36,993,846
Offsite Wastes	Various Other Sources	1,647,532
WDW147 & WDW319 Wastes	On Site	38,641,378

TABLE 6-2
AVERAGE AND MAXIMUM RATES OF INJECTION AT
SASOL CHEMICALS (USA), LLC GREENS BAYOU PLANT

TIME DURATION	AVERAGE INJECTION VOLUME (GALLONS)*	MAXIMUM INJECTION VOLUME (GALLONS)*
Cumulative Volume Per Minute	230	750
Cumulative Volume Per Day	330,600	1,080,000
Cumulative Volume Per Month	10,062,637	32,872,500
Cumulative Volume Per Year	120,751,650	394,470,000

* Assumes 30.4375-day month and 365.25-day year

TABLE 6-3
INJECTION WELL CHECKLIST

WDW No.	Status ¹	Injected Volume ²	Maximum Permitted Injection Rate ³	Number of Years Utilized	Date in Service
Plant Well No. 1 (WDW147)	Active	2,178,624,044	394,470,000	40	1979
Plant Well No. 2 (WDW319)	Active	1,427,223,760	394,470,000	18	12/27/2000

¹Indicate only one of the following: Active, Inactive, Closed, or Proposed

²Total volume (billion gallons) injected into the well, cumulative to year end 2017

³Gallons per year – per well limit based on 750 gpm per injection interval cumulative for 365.25 days

TABLE 6-3 4
MODELED MAXIMUM PRESSURE INCREASE AT THE INJECTION WELLS

Injection Interval	Reference Depth (feet-bgl)	Modeled Pressure Increase (psi)	Original Pressure Reference Depth (psi)	Compliance Pressure at Reference Depth (psi)
Frio E&F Sand	6,548	283.5	2,824.3	3,107.8
Frio A/B/C Sand	6,820.5	495.2	2,956.2	3,451.4

TABLE 6-5
MODELED INPUTS FOR THE ANNUAL TESTING DEMONSTRATION

Injection Interval	Transmissibility¹ (md·ft/cp)	Mobility² (md/cp)
Frio E&F Sand	444,444.4	5,769.2
Frio A/B/C Sand	454,833.3	5,769.2

¹ Operational Pressure Model – DuPont Multilayer Pressure Model

² Long-term Plume Transport Model – DuPont 10,000 Year Waste Plume Model

APPENDICES



APPENDIX 6-1
SASOL CHEMICALS (USA), LLC
2018 WASTE STREAM ANALYSIS REPORT



10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

May 17, 2018

Rod Batts
Sasol Chemicals (USA) LLC
1914 Haden Road

Houston, TX 77015-6498

Work Order: **HS18050449**

Laboratory Results for: **T605 Annual CY2018**

Dear Rod,

ALS Environmental received 1 sample(s) on May 08, 2018 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

A handwritten signature in black ink that reads "Bernadette Fini".

Generated By: JUMOKE.LAWAL

Bernadette A. Fini
Project Manager

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
Work Order: HS18050449

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS18050449-01	191-082	Aqueous		08-May-2018 07:00	08-May-2018 13:37	<input type="checkbox"/>

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
Work Order: HS18050449

CASE NARRATIVE**Work Order Comments**

- Sample received outside method holding time for pH. pH is an immediate test. Sample results are flagged with an "H" qualifier.
- The temperature at the time of pH is reported. Please note that all pH results are already normalized to a temperature of 25 °C.

GC Semivolatiles by Method TX1005**Batch ID: 128233**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

GCMS Semivolatiles by Method SW8270**Batch ID: 128273****Sample ID: 191-082 (HS18050449-01)**

- One or more of the GCMS semi-volatile internal standards were recovered at <50%. The sample was reanalyzed with similar results indicating a sample matrix interference.
- The GCMS semi-volatile extract of this sample was run at a dilution due to a high level of matrix interference.
- The surrogate recoveries could not be determined due to dilution below the calibration range.

GCMS Volatiles by Method SW8260**Batch ID: R316265****Sample ID: 191-082 (HS18050449-01)**

- Lowest practical dilution for sample hs18050449-01. Sample is very foamy.

Sample ID: HS18050640-01MS

- MS and MSD are for an unrelated sample

Metals by Method SW7470**Batch ID: 128345**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Metals by Method SW6020**Batch ID: 128296****Sample ID: 191-082 (HS18050449-01)**

- Sample ran at a 10x due to sample viscosity. High Sodium concentration.

Sample ID: HS18050500-01MS

- MS/MSD and DUPs are for an unrelated sample

WetChemistry by Method SW7.3.3.2**Batch ID: R316225**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
Work Order: HS18050449

CASE NARRATIVE**WetChemistry by Method E180.1****Batch ID: R316413**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW7.3.4.2**Batch ID: R316222**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW1010**Batch ID: R316018**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SM4500H+ B**Batch ID: R315920**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Client: Sasol Chemicals (USA) LLC
 Project: T605 Annual CY2018
 Sample ID: 191-082
 Collection Date: 08-May-2018 07:00

ANALYTICAL REPORT

WorkOrder:HS18050449
 Lab ID:HS18050449-01
 Matrix:Aqueous

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED	
VOLATILES - SW8260C		Method:SW8260					
1,1,1-Trichloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,1,2,2-Tetrachloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,1,2-Trichlor-1,2,2-trifluoroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,1,2-Trichloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,1-Dichloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,1-Dichloroethene	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2,4-Trichlorobenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2-Dibromo-3-chloropropane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2-Dibromoethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2-Dichlorobenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2-Dichloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,2-Dichloropropane	ND		0.50	mg/L	100	16-May-2018 09:54	
1,3-Dichlorobenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
1,4-Dichlorobenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
2-Butanone	ND		1.0	mg/L	100	16-May-2018 09:54	
2-Hexanone	ND		1.0	mg/L	100	16-May-2018 09:54	
4-Methyl-2-pentanone	ND		1.0	mg/L	100	16-May-2018 09:54	
Acetone	ND		1.0	mg/L	100	16-May-2018 09:54	
Benzene	2.4		0.50	mg/L	100	16-May-2018 09:54	
Bromodichloromethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Bromoform	ND		0.50	mg/L	100	16-May-2018 09:54	
Bromomethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Carbon disulfide	ND		1.0	mg/L	100	16-May-2018 09:54	
Carbon tetrachloride	ND		0.50	mg/L	100	16-May-2018 09:54	
Chlorobenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
Chloroethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Chloroform	ND		0.50	mg/L	100	16-May-2018 09:54	
Chloromethane	ND		0.50	mg/L	100	16-May-2018 09:54	
cis-1,2-Dichloroethene	ND		0.50	mg/L	100	16-May-2018 09:54	
cis-1,3-Dichloropropene	ND		0.50	mg/L	100	16-May-2018 09:54	
Cyclohexane	ND	n	0.50	mg/L	100	16-May-2018 09:54	
Dibromochloromethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Dichlorodifluoromethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Ethylbenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
Isopropylbenzene	ND		0.50	mg/L	100	16-May-2018 09:54	
m,p-Xylene	ND		1.0	mg/L	100	16-May-2018 09:54	
Methyl acetate	ND		0.50	mg/L	100	16-May-2018 09:54	
Methyl tert-butyl ether	ND		0.50	mg/L	100	16-May-2018 09:54	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
 Project: T605 Annual CY2018
 Sample ID: 191-082
 Collection Date: 08-May-2018 07:00

ANALYTICAL REPORT
 WorkOrder:HS18050449
 Lab ID:HS18050449-01
 Matrix:Aqueous

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED	
VOLATILES - SW8260C		Method:SW8260					
Methylcyclohexane	ND		0.50	mg/L	100	16-May-2018 09:54	
Methylene chloride	ND		1.0	mg/L	100	16-May-2018 09:54	
o-Xylene	ND		0.50	mg/L	100	16-May-2018 09:54	
Styrene	ND		0.50	mg/L	100	16-May-2018 09:54	
Tetrachloroethene	ND		0.50	mg/L	100	16-May-2018 09:54	
Toluene	1.5		0.50	mg/L	100	16-May-2018 09:54	
trans-1,2-Dichloroethene	ND		0.50	mg/L	100	16-May-2018 09:54	
trans-1,3-Dichloropropene	ND		0.50	mg/L	100	16-May-2018 09:54	
Trichloroethene	ND		0.50	mg/L	100	16-May-2018 09:54	
Trichlorofluoromethane	ND		0.50	mg/L	100	16-May-2018 09:54	
Vinyl chloride	ND		0.20	mg/L	100	16-May-2018 09:54	
Xylenes, Total	ND		0.50	mg/L	100	16-May-2018 09:54	
<i>Surr: 1,2-Dichloroethane-d4</i>	80.8		70-126	%REC	100	16-May-2018 09:54	
<i>Surr: 4-Bromofluorobenzene</i>	95.8		82-124	%REC	100	16-May-2018 09:54	
<i>Surr: Dibromofluoromethane</i>	84.0		77-123	%REC	100	16-May-2018 09:54	
<i>Surr: Toluene-d8</i>	89.0		82-127	%REC	100	16-May-2018 09:54	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
 Project: T605 Annual CY2018
 Sample ID: 191-082
 Collection Date: 08-May-2018 07:00

ANALYTICAL REPORT
 WorkOrder:HS18050449
 Lab ID:HS18050449-01
 Matrix:Aqueous

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
SEMIVOLATILES - 8270D			Method:SW8270	Prep:SW3510 / 11-May-2018		Analyst: SGA
1,1'-Biphenyl	ND		1000	ug/L	50	14-May-2018 14:33
2,4,5-Trichlorophenol	ND		1000	ug/L	50	14-May-2018 14:33
2,4,6-Trichlorophenol	ND		1000	ug/L	50	14-May-2018 14:33
2,4-Dichlorophenol	ND		1000	ug/L	50	14-May-2018 14:33
2,4-Dimethylphenol	890,000		100000	ug/L	5000	14-May-2018 19:38
2,4-Dinitrophenol	ND		1000	ug/L	50	14-May-2018 14:33
2,4-Dinitrotoluene	ND		1000	ug/L	50	14-May-2018 14:33
2,6-Dinitrotoluene	ND		1000	ug/L	50	14-May-2018 14:33
2-Chloronaphthalene	ND		1000	ug/L	50	14-May-2018 14:33
2-Chlorophenol	ND		1000	ug/L	50	14-May-2018 14:33
2-Methylnaphthalene	1,000		1000	ug/L	50	14-May-2018 14:33
2-Methylphenol	330,000		100000	ug/L	5000	14-May-2018 19:38
2-Nitroaniline	ND		1000	ug/L	50	14-May-2018 14:33
2-Nitrophenol	ND		1000	ug/L	50	14-May-2018 14:33
3&4-Methylphenol	1,800,000		100000	ug/L	5000	14-May-2018 19:38
3,3'-Dichlorobenzidine	ND		1000	ug/L	50	14-May-2018 14:33
3-Nitroaniline	ND		1000	ug/L	50	14-May-2018 14:33
4,6-Dinitro-2-methylphenol	ND		1000	ug/L	50	14-May-2018 14:33
4-Bromophenyl phenyl ether	ND		1000	ug/L	50	14-May-2018 14:33
4-Chloro-3-methylphenol	ND		1000	ug/L	50	14-May-2018 14:33
4-Chloroaniline	ND		1000	ug/L	50	14-May-2018 14:33
4-Chlorophenyl phenyl ether	ND		1000	ug/L	50	14-May-2018 14:33
4-Nitroaniline	ND		1000	ug/L	50	14-May-2018 14:33
4-Nitrophenol	ND		1000	ug/L	50	14-May-2018 14:33
Acenaphthene	ND		1000	ug/L	50	14-May-2018 14:33
Acenaphthylene	ND		1000	ug/L	50	14-May-2018 14:33
Acetophenone	3,200		1000	ug/L	50	14-May-2018 14:33
Anthracene	ND		1000	ug/L	50	14-May-2018 14:33
Atrazine	ND		1000	ug/L	50	14-May-2018 14:33
Benz(a)anthracene	ND		1000	ug/L	50	14-May-2018 14:33
Benzaldehyde	ND	n	1000	ug/L	50	14-May-2018 14:33
Benzo(a)pyrene	ND		1000	ug/L	50	14-May-2018 14:33
Benzo(b)fluoranthene	ND		1000	ug/L	50	14-May-2018 14:33
Benzo(g,h,i)perylene	ND		1000	ug/L	50	14-May-2018 14:33
Benzo(k)fluoranthene	ND		1000	ug/L	50	14-May-2018 14:33
Bis(2-chloroethoxy)methane	ND		1000	ug/L	50	14-May-2018 14:33
Bis(2-chloroethyl)ether	ND		1000	ug/L	50	14-May-2018 14:33
Bis(2-chloroisopropyl)ether	ND		1000	ug/L	50	14-May-2018 14:33

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
 Project: T605 Annual CY2018
 Sample ID: 191-082
 Collection Date: 08-May-2018 07:00

ANALYTICAL REPORT
 WorkOrder:HS18050449
 Lab ID:HS18050449-01
 Matrix:Aqueous

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
SEMIVOLATILES - 8270D		Method:SW8270				Prep:SW3510 / 11-May-2018 Analyst: SGA
Bis(2-ethylhexyl)phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Butyl benzyl phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Caprolactam	ND		1000	ug/L	50	14-May-2018 14:33
Carbazole	ND		1000	ug/L	50	14-May-2018 14:33
Chrysene	ND		1000	ug/L	50	14-May-2018 14:33
Dibenz(a,h)anthracene	ND		1000	ug/L	50	14-May-2018 14:33
Dibenzofuran	ND		1000	ug/L	50	14-May-2018 14:33
Diethyl phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Dimethyl phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Di-n-butyl phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Di-n-octyl phthalate	ND		1000	ug/L	50	14-May-2018 14:33
Fluoranthene	ND		1000	ug/L	50	14-May-2018 14:33
Fluorene	ND		1000	ug/L	50	14-May-2018 14:33
Hexachlorobenzene	ND		1000	ug/L	50	14-May-2018 14:33
Hexachlorobutadiene	ND		1000	ug/L	50	14-May-2018 14:33
Hexachlorocyclopentadiene	ND		1000	ug/L	50	14-May-2018 14:33
Hexachloroethane	ND		1000	ug/L	50	14-May-2018 14:33
Indeno(1,2,3-cd)pyrene	ND		1000	ug/L	50	14-May-2018 14:33
Isophorone	ND		1000	ug/L	50	14-May-2018 14:33
Naphthalene	16,000		1000	ug/L	50	14-May-2018 14:33
Nitrobenzene	ND		1000	ug/L	50	14-May-2018 14:33
N-Nitrosodi-n-propylamine	ND		1000	ug/L	50	14-May-2018 14:33
N-Nitrosodiphenylamine	ND		1000	ug/L	50	14-May-2018 14:33
Pentachlorophenol	ND		1000	ug/L	50	14-May-2018 14:33
Phenanthrene	ND		1000	ug/L	50	14-May-2018 14:33
Phenol	290,000		100000	ug/L	5000	14-May-2018 19:38
Pyrene	ND		1000	ug/L	50	14-May-2018 14:33
Surr: 2,4,6-Tribromophenol	0	S	42-124	%REC	50	14-May-2018 14:33
Surr: 2,4,6-Tribromophenol	0	S	42-124	%REC	5000	14-May-2018 19:38
Surr: 2-Fluorobiphenyl	0	S	48-120	%REC	5000	14-May-2018 19:38
Surr: 2-Fluorobiphenyl	0	S	48-120	%REC	50	14-May-2018 14:33
Surr: 2-Fluorophenol	0	S	20-120	%REC	50	14-May-2018 14:33
Surr: 2-Fluorophenol	0	S	20-120	%REC	5000	14-May-2018 19:38
Surr: 4-Terphenyl-d14	0	S	51-135	%REC	5000	14-May-2018 19:38
Surr: 4-Terphenyl-d14	0	S	51-135	%REC	50	14-May-2018 14:33
Surr: Nitrobenzene-d5	0	S	41-120	%REC	5000	14-May-2018 19:38
Surr: Nitrobenzene-d5	0	S	41-120	%REC	50	14-May-2018 14:33
Surr: Phenol-d6	0	S	20-120	%REC	5000	14-May-2018 19:38

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
 Project: T605 Annual CY2018
 Sample ID: 191-082
 Collection Date: 08-May-2018 07:00

ANALYTICAL REPORT
 WorkOrder:HS18050449
 Lab ID:HS18050449-01
 Matrix:Aqueous

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
SEMIVOLATILES - 8270D Method:SW8270				Prep:SW3510 / 11-May-2018		Analyst: SGA
Surr: Phenol-d6	0	S	20-120	%REC	50	14-May-2018 14:33
TEXAS TPH BY TX1005 Method:TX1005				Prep:TX1005PR / 10-May-2018		Analyst: MBG
nC6 to nC12	84		5.0	mg/L	1	11-May-2018 00:54
>nC12 to nC28	32		5.0	mg/L	1	11-May-2018 00:54
>nC28 to nC35	ND		5.0	mg/L	1	11-May-2018 00:54
Total Petroleum Hydrocarbon	116		5.0	mg/L	1	11-May-2018 00:54
Surr: 2-Fluorobiphenyl	84.4		70-130	%REC	1	11-May-2018 00:54
Surr: Trifluoromethyl benzene	92.0		70-130	%REC	1	11-May-2018 00:54
ICP-MS METALS BY SW6020A Method:SW6020				Prep:SW3010A / 11-May-2018		Analyst: JDE
Antimony	ND		0.0200	mg/L	10	16-May-2018 20:09
Arsenic	0.177		0.0200	mg/L	10	16-May-2018 20:09
Barium	0.0438		0.0400	mg/L	10	16-May-2018 20:09
Beryllium	ND		0.0200	mg/L	10	16-May-2018 20:09
Cadmium	ND		0.0200	mg/L	10	16-May-2018 20:09
Chromium	ND		0.0400	mg/L	10	16-May-2018 20:09
Lead	ND		0.0200	mg/L	10	16-May-2018 20:09
Nickel	ND		0.0200	mg/L	10	16-May-2018 20:09
Selenium	ND		0.0200	mg/L	10	16-May-2018 20:09
Silver	ND		0.0200	mg/L	10	16-May-2018 23:18
MERCURY BY SW7470A Method:SW7470				Prep:SW7470 / 14-May-2018		Analyst: JBA
Mercury	0.00173		0.000200	mg/L	1	14-May-2018 15:39
TURBIDITY BY E180.1 Method:E180.1				Analyst: KMU		
Turbidity	74.3		10.0	NTU	10	09-May-2018 19:40
PH BY SM4500H+ B Method:SM4500H+ B				Analyst: MZD		
pH	12.9	H	0.100	pH Units	1	09-May-2018 17:07
Temp Deg C @pH	21.2	H	0	°C	1	09-May-2018 17:07
FLASH POINT BY PENSKY-MARTENS SW1010A Method:SW1010				Analyst: KAH		
Ignitability	> 212		70.0	°F	1	11-May-2018 11:00
REACTIVE CYANIDE Method:SW7.3.3.2				Prep:SW7.3.3.2		Analyst: MZD
Reactive Cyanide	ND	n	100	mg/Kg	1	15-May-2018 16:11
REACTIVE SULFIDE Method:SW7.3.4.2				Analyst: MZD		
Reactive Sulfide	ND	n	100	mg/Kg	1	15-May-2018 16:01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

WEIGHT LOG**Client:** Sasol Chemicals (USA) LLC**Project:** T605 Annual CY2018**WorkOrder:** HS18050449**Batch ID:** 128233**Method:** TEXAS TPH BY TX1005**Prep:** TX 1005_W PR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18050449-01	1	29.71	3 (mL)	0.101

Batch ID: 128273**Method:** SEMIVOLATILES - 8270D**Prep:** 3510_B

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18050449-01	1	980	4 (mL)	0.004082

Batch ID: 128296**Method:** ICP-MS METALS BY SW6020A**Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18050449-01	1	10	10 (mL)	1

Batch ID: 128345**Method:** MERCURY BY SW7470A**Prep:** HG_WPR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18050449-01	1	10	10 (mL)	1

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID	128233	Test Name : TEXAS TPH BY TX1005			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00		10 May 2018 11:35	11 May 2018 00:54	1
Batch ID	128273	Test Name : SEMIVOLATILES - 8270D			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00		11 May 2018 11:32	14 May 2018 19:38	5000
HS18050449-01	191-082	08 May 2018 07:00		11 May 2018 11:32	14 May 2018 14:33	50
Batch ID	128296	Test Name : ICP-MS METALS BY SW6020A			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00		11 May 2018 11:30	16 May 2018 23:18	10
HS18050449-01	191-082	08 May 2018 07:00		11 May 2018 11:30	16 May 2018 20:09	10
Batch ID	128345	Test Name : MERCURY BY SW7470A			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00		14 May 2018 12:55	14 May 2018 15:39	1
Batch ID	R315920	Test Name : PH BY SM4500H+ B			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			09 May 2018 17:07	1
Batch ID	R316018	Test Name : FLASH POINT BY PENSKY-MARTENS SW1010A			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			11 May 2018 11:00	1
Batch ID	R316222	Test Name : REACTIVE SULFIDE			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			15 May 2018 16:01	1
Batch ID	R316225	Test Name : REACTIVE CYANIDE			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			15 May 2018 16:11	1
Batch ID	R316265	Test Name : VOLATILES - SW8260C			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			16 May 2018 09:54	100
Batch ID	R316413	Test Name : TURBIDITY BY E180.1			Matrix: Aqueous	
HS18050449-01	191-082	08 May 2018 07:00			09 May 2018 19:40	10

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128233

Instrument: FID-13

Method: TX1005

MLK		Sample ID:	MLK-128233		Units:	mg/L	Analysis Date: 10-May-2018 17:38			
Client ID:		Run ID:		FID-13_315987	SeqNo:	4562351	PrepDate:	10-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
nC6 to nC12	ND	5.0								
>nC12 to nC28	ND	5.0								
>nC28 to nC35	ND	5.0								
Total Petroleum Hydrocarbon	ND	5.0								
Surr: 2-Fluorobiphenyl	1.767	0	2.5	0	70.7	70 - 130				
Surr: Trifluoromethyl benzene	2.143	0	2.5	0	85.7	70 - 130				
LCS		Sample ID:	LCS-128233		Units:	mg/L	Analysis Date: 10-May-2018 18:07			
Client ID:		Run ID:		FID-13_315987	SeqNo:	4562352	PrepDate:	10-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
nC6 to nC12	23.52	5.0	25	0	94.1	75 - 125				
>nC12 to nC28	28.43	5.0	25	0	114	75 - 125				
Surr: 2-Fluorobiphenyl	1.808	0	2.5	0	72.3	70 - 130				
Surr: Trifluoromethyl benzene	2.158	0	2.5	0	86.3	70 - 130				
LCSD		Sample ID:	LCSD-128233		Units:	mg/L	Analysis Date: 10-May-2018 18:36			
Client ID:		Run ID:		FID-13_315987	SeqNo:	4562353	PrepDate:	10-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
nC6 to nC12	23.57	5.0	25	0	94.3	75 - 125	23.52	0.214	20	
>nC12 to nC28	29.39	5.0	25	0	118	75 - 125	28.43	3.33	20	
Surr: 2-Fluorobiphenyl	1.777	0	2.5	0	71.1	70 - 130	1.808	1.7	20	
Surr: Trifluoromethyl benzene	2.14	0	2.5	0	85.6	70 - 130	2.158	0.864	20	
MS		Sample ID:	HS18050432-01MS		Units:	mg/L	Analysis Date: 10-May-2018 19:34			
Client ID:		Run ID:		FID-13_315987	SeqNo:	4562355	PrepDate:	10-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
nC6 to nC12	29.79	4.9	24.31	4.959	102	75 - 125				
>nC12 to nC28	31.25	4.9	24.31	4.759	109	75 - 125				
Surr: 2-Fluorobiphenyl	2.382	0	2.431	0	98.0	70 - 130				
Surr: Trifluoromethyl benzene	2.584	0	2.431	0	106	70 - 130				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128233 **Instrument:** FID-13 **Method:** TX1005

MSD	Sample ID:	HS18050432-01MSD		Units:	mg/L		Analysis Date: 10-May-2018 20:03			
Client ID:		Run ID: FID-13_315987		SeqNo:	4562356	PrepDate:	10-May-2018	DF:	1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual	
nC6 to nC12		30.04	5.0	24.8	4.959	101	75 - 125	29.79	0.831 20	
>nC12 to nC28		32.94	5.0	24.8	4.759	114	75 - 125	31.25	5.28 20	
Surr: 2-Fluorobiphenyl		2.029	0	2.48	0	81.8	70 - 130	2.382	16 20	
Surr: Trifluoromethyl benzene		2.406	0	2.48	0	97.0	70 - 130	2.584	7.12 20	

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128296

Instrument: ICPMS05

Method: SW6020

MLBK		Sample ID: MBLK-128296	Units: mg/L		Analysis Date: 15-May-2018 23:22					
Client ID:		Run ID: ICPMS05_316168	SeqNo: 4562087	PrepDate: 11-May-2018	DF: 1	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Analyte		Result	PQL	SPK Val						
Antimony		ND	0.00200							
Arsenic		ND	0.00200							
Barium		ND	0.00400							
Beryllium		ND	0.00200							
Cadmium		ND	0.00200							
Chromium		ND	0.00400							
Lead		ND	0.00200							
Nickel		ND	0.00200							
Selenium		ND	0.00200							

MLBK		Sample ID: MBLK-128296	Units: mg/L		Analysis Date: 16-May-2018 23:12					
Client ID:		Run ID: ICPMS05_316260	SeqNo: 4564238	PrepDate: 11-May-2018	DF: 1	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Analyte		Result	PQL	SPK Val						
Silver		ND	0.00200							

LCS		Sample ID: LCS-128296	Units: mg/L		Analysis Date: 15-May-2018 23:24					
Client ID:		Run ID: ICPMS05_316168	SeqNo: 4562088	PrepDate: 11-May-2018	DF: 1	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Analyte		Result	PQL	SPK Val						
Antimony		0.05119	0.00200	0.05	0	102	80 - 120			
Arsenic		0.04946	0.00200	0.05	0	98.9	80 - 120			
Barium		0.04596	0.00400	0.05	0	91.9	80 - 120			
Beryllium		0.05048	0.00200	0.05	0	101	80 - 120			
Cadmium		0.04628	0.00200	0.05	0	92.6	80 - 120			
Chromium		0.04902	0.00400	0.05	0	98.0	80 - 120			
Lead		0.05225	0.00200	0.05	0	105	80 - 120			
Nickel		0.04963	0.00200	0.05	0	99.3	80 - 120			
Selenium		0.05003	0.00200	0.05	0	100	80 - 120			

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128296		Instrument: ICPMS05		Method: SW6020			
LCS	Sample ID: LCS-128296			Units: mg/L		Analysis Date: 16-May-2018 23:14	
Client ID:		Run ID: ICPMS05_316260		SeqNo: 4564239	PrepDate: 11-May-2018	DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit RPD Ref Value %RPD Limit Qual
Silver		0.04798	0.00200	0.05	0	96.0	80 - 120
MS	Sample ID: HS18050500-01MS			Units: mg/L		Analysis Date: 15-May-2018 23:41	
Client ID:		Run ID: ICPMS05_316168		SeqNo: 4562096	PrepDate: 11-May-2018	DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit RPD Ref Value %RPD Limit Qual
Antimony		0.04787	0.00200	0.05	0	95.7	80 - 120
Arsenic		0.04946	0.00200	0.05	0.000892	97.1	80 - 120
Barium		1.854	0.00400	0.05	1.73	247	80 - 120
Beryllium		0.05018	0.00200	0.05	0.00031	99.7	80 - 120
Cadmium		0.04416	0.00200	0.05	0.000776	86.8	80 - 120
Chromium		0.04839	0.00400	0.05	0	96.8	80 - 120
Lead		0.04106	0.00200	0.05	0	82.1	80 - 120
Nickel		0.07455	0.00200	0.05	0.0278	93.5	80 - 120
Selenium		0.04789	0.00200	0.05	0.002338	91.1	80 - 120
MS	Sample ID: HS18050500-01MS			Units: mg/L		Analysis Date: 16-May-2018 23:28	
Client ID:		Run ID: ICPMS05_316260		SeqNo: 4564254	PrepDate: 11-May-2018	DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit RPD Ref Value %RPD Limit Qual
Silver		0.04387	0.00200	0.05	0.000046	87.6	80 - 120

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128296		Instrument: ICPMS05		Method: SW6020					
MSD	Sample ID: HS18050500-01MSD				Units: mg/L		Analysis Date: 15-May-2018 23:42		
Client ID:		Run ID: ICPMS05_316168			SeqNo: 4562097	PrepDate: 11-May-2018	DF: 1		
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Antimony	0.04739	0.00200	0.05	0	94.8	80 - 120	0.04787	1.01	20
Arsenic	0.0482	0.00200	0.05	0.000892	94.6	80 - 120	0.04946	2.59	20
Barium	1.888	0.00400	0.05	1.73	315	80 - 120	1.854	1.83	20 SEO
Beryllium	0.05069	0.00200	0.05	0.00031	101	80 - 120	0.05018	1.02	20
Cadmium	0.044	0.00200	0.05	0.000776	86.4	80 - 120	0.04416	0.365	20
Chromium	0.04781	0.00400	0.05	0	95.6	80 - 120	0.04839	1.2	20
Lead	0.04048	0.00200	0.05	0	81.0	80 - 120	0.04106	1.43	20
Nickel	0.07236	0.00200	0.05	0.0278	89.1	80 - 120	0.07455	2.99	20
Selenium	0.04814	0.00200	0.05	0.002338	91.6	80 - 120	0.04789	0.521	20
MSD	Sample ID: HS18050500-01MSD				Units: mg/L		Analysis Date: 16-May-2018 23:30		
Client ID:		Run ID: ICPMS05_316260			SeqNo: 4564255	PrepDate: 11-May-2018	DF: 1		
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Silver	0.04304	0.00200	0.05	0.000046	86.0	80 - 120	0.04387	1.91	20
PDS	Sample ID: HS18050500-01PDS				Units: mg/L		Analysis Date: 15-May-2018 23:44		
Client ID:		Run ID: ICPMS05_316168			SeqNo: 4562098	PrepDate: 11-May-2018	DF: 1		
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Antimony	0.09277	0.00200	0.1	0.000243	92.5	75 - 125			
Arsenic	0.09716	0.00200	0.1	0.000892	96.3	75 - 125			
Barium	1.726	0.00400	0.1	1.73	-3.88	75 - 125			SO
Beryllium	0.09285	0.00200	0.1	0.00031	92.5	75 - 125			
Cadmium	0.08315	0.00200	0.1	0.000776	82.4	75 - 125			
Chromium	0.09567	0.00400	0.1	0.000295	95.4	75 - 125			
Lead	0.08293	0.00200	0.1	0.000169	82.8	75 - 125			
Nickel	0.1146	0.00200	0.1	0.0278	86.8	75 - 125			
Selenium	0.09365	0.00200	0.1	0.002338	91.3	75 - 125			

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128296		Instrument: ICPMS05		Method: SW6020			
PDS	Sample ID: HS18050500-01PDS			Units: mg/L		Analysis Date: 16-May-2018 23:32	
Client ID:		Run ID: ICPMS05_316260		SeqNo: 4564256	PrepDate: 11-May-2018	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD Limit Qual
Silver	0.07906	0.00200	0.1	0.000046	79.0	75 - 125	
SD	Sample ID: HS18050500-01SD			Units: mg/L		Analysis Date: 15-May-2018 23:38	
Client ID:		Run ID: ICPMS05_316168		SeqNo: 4562095	PrepDate: 11-May-2018	DF: 5	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %D Limit Qual
Antimony	ND	0.0100				0.000243	0 10
Arsenic	ND	0.0100				0.000892	0 10
Barium	1.757	0.0200				1.73	1.57 10
Beryllium	ND	0.0100				0.00031	0 10
Cadmium	ND	0.0100				0.000776	0 10
Chromium	ND	0.0200				0.000295	0 10
Lead	ND	0.0100				0.000169	0 10
Nickel	0.02779	0.0100				0.0278	0.0144 10
Selenium	ND	0.0100				0.002338	0 10
SD	Sample ID: HS18050500-01SD			Units: mg/L		Analysis Date: 16-May-2018 23:26	
Client ID:		Run ID: ICPMS05_316260		SeqNo: 4564253	PrepDate: 11-May-2018	DF: 5	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %D Limit Qual
Silver	ND	0.0100				0.000046	0 10

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128345	Instrument: HG03	Method: SW7470
-------------------------	-------------------------	-----------------------

MLBK	Sample ID:	MLBK-128345	Units:	mg/L	Analysis Date: 14-May-2018 15:31			
Client ID:	Run ID:	HG03_316117	SeqNo:	4559346	PrepDate:	14-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Mercury	ND	0.000200						

LCS	Sample ID:	LCS-128345	Units:	mg/L	Analysis Date: 14-May-2018 15:32			
Client ID:	Run ID:	HG03_316117	SeqNo:	4559347	PrepDate:	14-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Mercury	0.00444	0.000200	0.005	0	88.8	80 - 120		

MS	Sample ID:	HS18050540-01MS	Units:	mg/L	Analysis Date: 14-May-2018 15:36			
Client ID:	Run ID:	HG03_316117	SeqNo:	4559349	PrepDate:	14-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Mercury	0.00414	0.000200	0.005	-0.000004	82.9	75 - 125		

MSD	Sample ID:	HS18050540-01MSD	Units:	mg/L	Analysis Date: 14-May-2018 15:38			
Client ID:	Run ID:	HG03_316117	SeqNo:	4559350	PrepDate:	14-May-2018	DF:	1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Mercury	0.00436	0.000200	0.005	-0.000004	87.3	75 - 125	0.00414	5.18 20

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
MLBK	Sample ID: MBLK-128273	Units: ug/L		Analysis Date: 11-May-2018 16:40			
Client ID:	Run ID: SV-4_316006			SeqNo: 4557180	PrepDate: 11-May-2018	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
1,1'-Biphenyl	ND	5.0					
2,4,5-Trichlorophenol	ND	5.0					
2,4,6-Trichlorophenol	ND	5.0					
2,4-Dichlorophenol	ND	5.0					
2,4-Dimethylphenol	ND	5.0					
2,4-Dinitrophenol	ND	5.0					
2,4-Dinitrotoluene	ND	5.0					
2,6-Dinitrotoluene	ND	5.0					
2-Chloronaphthalene	ND	5.0					
2-Chlorophenol	ND	5.0					
2-Methylnaphthalene	ND	5.0					
2-Methylphenol	ND	5.0					
2-Nitroaniline	ND	5.0					
2-Nitrophenol	ND	5.0					
3&4-Methylphenol	ND	5.0					
3,3'-Dichlorobenzidine	ND	5.0					
3-Nitroaniline	ND	5.0					
4,6-Dinitro-2-methylphenol	ND	5.0					
4-Bromophenyl phenyl ether	ND	5.0					
4-Chloro-3-methylphenol	ND	5.0					
4-Chloroaniline	ND	5.0					
4-Chlorophenyl phenyl ether	ND	5.0					
4-Nitroaniline	ND	5.0					
4-Nitrophenol	ND	5.0					
Acenaphthene	ND	5.0					
Acenaphthylene	ND	5.0					
Acetophenone	ND	5.0					
Anthracene	ND	5.0					
Atrazine	ND	5.0					
Benz(a)anthracene	ND	5.0					
Benzaldehyde	ND	5.0					
Benzo(a)pyrene	ND	5.0					
Benzo(b)fluoranthene	ND	5.0					
Benzo(g,h,i)perylene	ND	5.0					

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
MLBK	Sample ID: MBLK-128273	Units: ug/L		Analysis Date: 11-May-2018 16:40			
Client ID:	Run ID: SV-4_316006	SeqNo: 4557180		PrepDate: 11-May-2018	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Benzo(k)fluoranthene	ND	5.0					
Bis(2-chloroethoxy)methane	ND	5.0					
Bis(2-chloroethyl)ether	ND	5.0					
Bis(2-chloroisopropyl)ether	ND	5.0					
Bis(2-ethylhexyl)phthalate	ND	5.0					
Butyl benzyl phthalate	ND	5.0					
Caprolactam	ND	5.0					
Carbazole	ND	5.0					
Chrysene	ND	5.0					
Dibenz(a,h)anthracene	ND	5.0					
Dibenzofuran	ND	5.0					
Diethyl phthalate	ND	5.0					
Dimethyl phthalate	ND	5.0					
Di-n-butyl phthalate	ND	5.0					
Di-n-octyl phthalate	ND	5.0					
Fluoranthene	ND	5.0					
Fluorene	ND	5.0					
Hexachlorobenzene	ND	5.0					
Hexachlorobutadiene	ND	5.0					
Hexachlorocyclopentadiene	ND	5.0					
Hexachloroethane	ND	5.0					
Indeno(1,2,3-cd)pyrene	ND	5.0					
Isophorone	ND	5.0					
Naphthalene	ND	5.0					
Nitrobenzene	ND	5.0					
N-Nitrosodi-n-propylamine	ND	5.0					
N-Nitrosodiphenylamine	ND	5.0					
Pentachlorophenol	ND	5.0					
Phenanthrene	ND	5.0					
Phenol	ND	5.0					
Pyrene	ND	5.0					
Surr: 2,4,6-Tribromophenol	78.12	5.0	100	0	78.1	42 - 124	
Surr: 2-Fluorobiphenyl	82.17	5.0	100	0	82.2	48 - 120	
Surr: 2-Fluorophenol	70.56	5.0	100	0	70.6	20 - 120	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
MBLK	Sample ID: MBLK-128273		Units: ug/L	Analysis Date: 11-May-2018 16:40			
Client ID:		Run ID: SV-4_316006		SeqNo: 4557180	PrepDate: 11-May-2018	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Surr: 4-Terphenyl-d14	83.67	5.0	100	0	83.7	51 - 135	
Surr: Nitrobenzene-d5	85.87	5.0	100	0	85.9	41 - 120	
Surr: Phenol-d6	71.21	5.0	100	0	71.2	20 - 120	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
LCS	Sample ID: LCS-128273	Units: ug/L		Analysis Date: 11-May-2018 15:34			
Client ID:	Run ID: SV-4_316006			SeqNo: 4557178	PrepDate: 11-May-2018	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
1,1'-Biphenyl	41.55	5.0	50	0	83.1	55 - 120	
2,4,5-Trichlorophenol	84.16	5.0	100	0	84.2	55 - 120	
2,4,6-Trichlorophenol	84.3	5.0	100	0	84.3	55 - 120	
2,4-Dichlorophenol	90.23	5.0	100	0	90.2	55 - 120	
2,4-Dimethylphenol	88.11	5.0	100	0	88.1	55 - 125	
2,4-Dinitrophenol	76.75	5.0	100	0	76.7	40 - 125	
2,4-Dinitrotoluene	43.66	5.0	50	0	87.3	55 - 125	
2,6-Dinitrotoluene	44.93	5.0	50	0	89.9	55 - 120	
2-Chloronaphthalene	49.66	5.0	50	0	99.3	55 - 145	
2-Chlorophenol	85.39	5.0	100	0	85.4	55 - 120	
2-Methylnaphthalene	42.86	5.0	50	0	85.7	55 - 120	
2-Methylphenol	90.03	5.0	100	0	90.0	55 - 120	
2-Nitroaniline	51.61	5.0	50	0	103	55 - 130	
2-Nitrophenol	86.56	5.0	100	0	86.6	55 - 120	
3&4-Methylphenol	135.2	5.0	150	0	90.1	55 - 120	
3,3'-Dichlorobenzidine	38.06	5.0	50	0	76.1	32 - 125	
3-Nitroaniline	31.16	5.0	50	0	62.3	43 - 120	
4,6-Dinitro-2-methylphenol	92.55	5.0	100	0	92.6	50 - 130	
4-Bromophenyl phenyl ether	42.75	5.0	50	0	85.5	55 - 120	
4-Chloro-3-methylphenol	90.53	5.0	100	0	90.5	55 - 120	
4-Chloroaniline	25.42	5.0	50	0	50.8	30 - 120	
4-Chlorophenyl phenyl ether	41.82	5.0	50	0	83.6	55 - 120	
4-Nitroaniline	41.76	5.0	50	0	83.5	55 - 120	
4-Nitrophenol	92.16	5.0	100	0	92.2	50 - 130	
Acenaphthene	43.5	5.0	50	0	87.0	55 - 120	
Acenaphthylene	42.7	5.0	50	0	85.4	55 - 120	
Acetophenone	39.62	5.0	50	0	79.2	54 - 120	
Anthracene	44.64	5.0	50	0	89.3	55 - 120	
Atrazine	43.28	5.0	50	0	86.6	55 - 130	
Benz(a)anthracene	45.05	5.0	50	0	90.1	55 - 125	
Benzaldehyde	30.39	5.0	50	0	60.8	20 - 132	
Benzo(a)pyrene	42	5.0	50	0	84.0	55 - 120	
Benzo(b)fluoranthene	46.98	5.0	50	0	94.0	55 - 125	
Benzo(g,h,i)perylene	46.82	5.0	50	0	93.6	55 - 120	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
LCS	Sample ID: LCS-128273	Units: ug/L		Analysis Date: 11-May-2018 15:34			
Client ID:	Run ID: SV-4_316006	SeqNo: 4557178		PrepDate: 11-May-2018	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Benzo(k)fluoranthene	42.73	5.0	50	0	85.5	55 - 130	
Bis(2-chloroethoxy)methane	43.74	5.0	50	0	87.5	55 - 120	
Bis(2-chloroethyl)ether	47.62	5.0	50	0	95.2	55 - 120	
Bis(2-chloroisopropyl)ether	31.62	5.0	50	0	63.2	55 - 120	
Bis(2-ethylhexyl)phthalate	48.9	5.0	50	0	97.8	55 - 125	
Butyl benzyl phthalate	47.01	5.0	50	0	94.0	55 - 125	
Caprolactam	59.26	5.0	50	0	119	55 - 140	
Carbazole	46.88	5.0	50	0	93.8	55 - 120	
Chrysene	46.37	5.0	50	0	92.7	55 - 125	
Dibenz(a,h)anthracene	50.02	5.0	50	0	100	55 - 120	
Dibenzofuran	42.69	5.0	50	0	85.4	55 - 120	
Diethyl phthalate	43.11	5.0	50	0	86.2	55 - 120	
Dimethyl phthalate	45.08	5.0	50	0	90.2	55 - 120	
Di-n-butyl phthalate	46	5.0	50	0	92.0	55 - 125	
Di-n-octyl phthalate	48.41	5.0	50	0	96.8	55 - 130	
Fluoranthene	45.82	5.0	50	0	91.6	55 - 125	
Fluorene	42.89	5.0	50	0	85.8	55 - 120	
Hexachlorobenzene	43.65	5.0	50	0	87.3	55 - 120	
Hexachlorobutadiene	40.35	5.0	50	0	80.7	55 - 120	
Hexachlorocyclopentadiene	30.56	5.0	50	0	61.1	50 - 120	
Hexachloroethane	40.45	5.0	50	0	80.9	55 - 120	
Indeno(1,2,3-cd)pyrene	49.07	5.0	50	0	98.1	55 - 125	
Isophorone	44.56	5.0	50	0	89.1	55 - 120	
Naphthalene	43.48	5.0	50	0	87.0	55 - 120	
Nitrobenzene	45.38	5.0	50	0	90.8	55 - 120	
N-Nitrosodi-n-propylamine	43.08	5.0	50	0	86.2	55 - 120	
N-Nitrosodiphenylamine	47.29	5.0	50	0	94.6	55 - 120	
Pentachlorophenol	88.05	5.0	100	0	88.1	50 - 135	
Phenanthrene	42.17	5.0	50	0	84.3	55 - 120	
Phenol	85.39	5.0	100	0	85.4	50 - 120	
Pyrene	46.03	5.0	50	0	92.1	55 - 125	
Surr: 2,4,6-Tribromophenol	74.55	5.0	100	0	74.6	42 - 124	
Surr: 2-Fluorobiphenyl	80.74	5.0	100	0	80.7	48 - 120	
Surr: 2-Fluorophenol	80.68	5.0	100	0	80.7	20 - 120	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270			
LCS	Sample ID: LCS-128273			Units: ug/L		Analysis Date: 11-May-2018 15:34	
Client ID:		Run ID: SV-4_316006		SeqNo: 4557178	PrepDate: 11-May-2018	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Surr: 4-Terphenyl-d14	85.14	5.0	100	0	85.1	51 - 135	
Surr: Nitrobenzene-d5	82.02	5.0	100	0	82.0	41 - 120	
Surr: Phenol-d6	77.75	5.0	100	0	77.7	20 - 120	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270					
LCSD	Sample ID: LCSD-128273			Units: ug/L		Analysis Date: 11-May-2018 16:18			
Client ID:		Run ID: SV-4_316006		SeqNo: 4557179		PrepDate: 11-May-2018		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1'-Biphenyl	41.69	5.0	50	0	83.4	55 - 120	41.55	0.332	20
2,4,5-Trichlorophenol	85.76	5.0	100	0	85.8	55 - 120	84.16	1.89	20
2,4,6-Trichlorophenol	82.17	5.0	100	0	82.2	55 - 120	84.3	2.56	20
2,4-Dichlorophenol	89.25	5.0	100	0	89.3	55 - 120	90.23	1.1	20
2,4-Dimethylphenol	86.27	5.0	100	0	86.3	55 - 125	88.11	2.11	20
2,4-Dinitrophenol	73.64	5.0	100	0	73.6	40 - 125	76.75	4.14	20
2,4-Dinitrotoluene	42.38	5.0	50	0	84.8	55 - 125	43.66	2.98	20
2,6-Dinitrotoluene	43.68	5.0	50	0	87.4	55 - 120	44.93	2.82	20
2-Chloronaphthalene	49.48	5.0	50	0	99.0	55 - 145	49.66	0.349	20
2-Chlorophenol	84.33	5.0	100	0	84.3	55 - 120	85.39	1.24	20
2-Methylnaphthalene	41.82	5.0	50	0	83.6	55 - 120	42.86	2.44	20
2-Methylphenol	87.64	5.0	100	0	87.6	55 - 120	90.03	2.69	20
2-Nitroaniline	50.87	5.0	50	0	102	55 - 130	51.61	1.45	20
2-Nitrophenol	86	5.0	100	0	86.0	55 - 120	86.56	0.64	20
3&4-Methylphenol	129.9	5.0	150	0	86.6	55 - 120	135.2	3.94	20
3,3'-Dichlorobenzidine	36.72	5.0	50	0	73.4	32 - 125	38.06	3.57	20
3-Nitroaniline	29.89	5.0	50	0	59.8	43 - 120	31.16	4.17	20
4,6-Dinitro-2-methylphenol	90.29	5.0	100	0	90.3	50 - 130	92.55	2.48	20
4-Bromophenyl phenyl ether	42.98	5.0	50	0	86.0	55 - 120	42.75	0.557	20
4-Chloro-3-methylphenol	86.69	5.0	100	0	86.7	55 - 120	90.53	4.34	20
4-Chloroaniline	22.75	5.0	50	0	45.5	30 - 120	25.42	11.1	20
4-Chlorophenyl phenyl ether	42.24	5.0	50	0	84.5	55 - 120	41.82	1.01	20
4-Nitroaniline	41.98	5.0	50	0	84.0	55 - 120	41.76	0.518	20
4-Nitrophenol	88.45	5.0	100	0	88.5	50 - 130	92.16	4.1	20
Acenaphthene	43.02	5.0	50	0	86.0	55 - 120	43.5	1.11	20
Acenaphthylene	42.3	5.0	50	0	84.6	55 - 120	42.7	0.933	20
Acetophenone	39.62	5.0	50	0	79.2	54 - 120	39.62	0.00582	20
Anthracene	44.61	5.0	50	0	89.2	55 - 120	44.64	0.0564	20
Atrazine	42.62	5.0	50	0	85.2	55 - 130	43.28	1.55	20
Benz(a)anthracene	44.64	5.0	50	0	89.3	55 - 125	45.05	0.921	20
Benzaldehyde	32.18	5.0	50	0	64.4	20 - 132	30.39	5.74	20
Benzo(a)pyrene	41.12	5.0	50	0	82.2	55 - 120	42	2.12	20
Benzo(b)fluoranthene	44.78	5.0	50	0	89.6	55 - 125	46.98	4.79	20
Benzo(g,h,i)perylene	49.34	5.0	50	0	98.7	55 - 120	46.82	5.25	20

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273		Instrument: SV-4		Method: SW8270					
LCSD	Sample ID: LCSD-128273			Units: ug/L		Analysis Date: 11-May-2018 16:18			
Client ID:		Run ID: SV-4_316006		SeqNo: 4557179		PrepDate: 11-May-2018		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Benzo(k)fluoranthene	41.92	5.0	50	0	83.8	55 - 130	42.73	1.92	20
Bis(2-chloroethoxy)methane	43.32	5.0	50	0	86.6	55 - 120	43.74	0.967	20
Bis(2-chloroethyl)ether	43.19	5.0	50	0	86.4	55 - 120	47.62	9.75	20
Bis(2-chloroisopropyl)ether	31.51	5.0	50	0	63.0	55 - 120	31.62	0.378	20
Bis(2-ethylhexyl)phthalate	44.64	5.0	50	0	89.3	55 - 125	48.9	9.13	20
Butyl benzyl phthalate	43.36	5.0	50	0	86.7	55 - 125	47.01	8.08	20
Caprolactam	58.66	5.0	50	0	117	55 - 140	59.26	1.02	20
Carbazole	48.49	5.0	50	0	97.0	55 - 120	46.88	3.39	20
Chrysene	46	5.0	50	0	92.0	55 - 125	46.37	0.793	20
Dibenz(a,h)anthracene	48.95	5.0	50	0	97.9	55 - 120	50.02	2.17	20
Dibenzofuran	42.36	5.0	50	0	84.7	55 - 120	42.69	0.77	20
Diethyl phthalate	41.59	5.0	50	0	83.2	55 - 120	43.11	3.6	20
Dimethyl phthalate	44.07	5.0	50	0	88.1	55 - 120	45.08	2.26	20
Di-n-butyl phthalate	45.34	5.0	50	0	90.7	55 - 125	46	1.44	20
Di-n-octyl phthalate	40.25	5.0	50	0	80.5	55 - 130	48.41	18.4	20
Fluoranthene	47.48	5.0	50	0	95.0	55 - 125	45.82	3.54	20
Fluorene	42.65	5.0	50	0	85.3	55 - 120	42.89	0.557	20
Hexachlorobenzene	43.14	5.0	50	0	86.3	55 - 120	43.65	1.17	20
Hexachlorobutadiene	42.62	5.0	50	0	85.2	55 - 120	40.35	5.47	20
Hexachlorocyclopentadiene	30.72	5.0	50	0	61.4	50 - 120	30.56	0.53	20
Hexachloroethane	40.47	5.0	50	0	80.9	55 - 120	40.45	0.0678	20
Indeno(1,2,3-cd)pyrene	49.54	5.0	50	0	99.1	55 - 125	49.07	0.94	20
Isophorone	43.49	5.0	50	0	87.0	55 - 120	44.56	2.43	20
Naphthalene	43.79	5.0	50	0	87.6	55 - 120	43.48	0.72	20
Nitrobenzene	46.16	5.0	50	0	92.3	55 - 120	45.38	1.68	20
N-Nitrosodi-n-propylamine	40.92	5.0	50	0	81.8	55 - 120	43.08	5.13	20
N-Nitrosodiphenylamine	46.34	5.0	50	0	92.7	55 - 120	47.29	2.04	20
Pentachlorophenol	87.58	5.0	100	0	87.6	50 - 135	88.05	0.533	20
Phenanthrene	43.55	5.0	50	0	87.1	55 - 120	42.17	3.2	20
Phenol	83.59	5.0	100	0	83.6	50 - 120	85.39	2.13	20
Pyrene	43.76	5.0	50	0	87.5	55 - 125	46.03	5.04	20
Surr: 2,4,6-Tribromophenol	73.5	5.0	100	0	73.5	42 - 124	74.55	1.43	20
Surr: 2-Fluorobiphenyl	82.35	5.0	100	0	82.4	48 - 120	80.74	1.98	20
Surr: 2-Fluorophenol	79.75	5.0	100	0	79.7	20 - 120	80.68	1.16	20

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: 128273

Instrument: SV-4

Method: SW8270

LCSD	Sample ID:	LCSD-128273		Units:	ug/L		Analysis Date: 11-May-2018 16:18			
Client ID:		Run ID: SV-4_316006			SeqNo: 4557179	PrepDate: 11-May-2018	DF: 1			
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
<i>Surr: 4-Terphenyl-d14</i>		80.19	5.0	100	0	80.2	51 - 135	85.14	5.98	20
<i>Surr: Nitrobenzene-d5</i>		82.54	5.0	100	0	82.5	41 - 120	82.02	0.63	20
<i>Surr: Phenol-d6</i>		75.54	5.0	100	0	75.5	20 - 120	77.75	2.88	20

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260				
MBLK	Sample ID: VBLKW-180515	Units: ug/L		Analysis Date: 16-May-2018 00:05				
Client ID:	Run ID: VOA6_316265	SeqNo: 4562510	PrepDate:	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
1,1,1-Trichloroethane	ND	5.0						
1,1,2,2-Tetrachloroethane	ND	5.0						
1,1,2-Trichlor-1,2,2-trifluoroethane	ND	5.0						
1,1,2-Trichloroethane	ND	5.0						
1,1-Dichloroethane	ND	5.0						
1,1-Dichloroethene	ND	5.0						
1,2,4-Trichlorobenzene	ND	5.0						
1,2-Dibromo-3-chloropropane	ND	5.0						
1,2-Dibromoethane	ND	5.0						
1,2-Dichlorobenzene	ND	5.0						
1,2-Dichloroethane	ND	5.0						
1,2-Dichloropropane	ND	5.0						
1,3-Dichlorobenzene	ND	5.0						
1,4-Dichlorobenzene	ND	5.0						
2-Butanone	ND	10						
2-Hexanone	ND	10						
4-Methyl-2-pentanone	ND	10						
Acetone	ND	10						
Benzene	ND	5.0						
Bromodichloromethane	ND	5.0						
Bromoform	ND	5.0						
Bromomethane	ND	5.0						
Carbon disulfide	ND	10						
Carbon tetrachloride	ND	5.0						
Chlorobenzene	ND	5.0						
Chloroethane	ND	5.0						
Chloroform	ND	5.0						
Chloromethane	ND	5.0						
cis-1,2-Dichloroethene	ND	5.0						
cis-1,3-Dichloropropene	ND	5.0						
Cyclohexane	ND	5.0						
Dibromochloromethane	ND	5.0						
Dichlorodifluoromethane	ND	5.0						
Ethylbenzene	ND	5.0						

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260				
MBLK	Sample ID: VBLKW-180515	Units: ug/L		Analysis Date: 16-May-2018 00:05				
Client ID:	Run ID: VOA6_316265	SeqNo: 4562510	PrepDate:	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Isopropylbenzene	ND	5.0						
m,p-Xylene	ND	10						
Methyl acetate	ND	5.0						
Methyl tert-butyl ether	ND	5.0						
Methylcyclohexane	ND	5.0						
Methylene chloride	ND	10						
o-Xylene	ND	5.0						
Styrene	ND	5.0						
Tetrachloroethene	ND	5.0						
Toluene	ND	5.0						
trans-1,2-Dichloroethene	ND	5.0						
trans-1,3-Dichloropropene	ND	5.0						
Trichloroethene	ND	5.0						
Trichlorofluoromethane	ND	5.0						
Vinyl chloride	ND	2.0						
Xylenes, Total	ND	5.0						
Surr: 1,2-Dichloroethane-d4	43.37	0	50	0	86.7	70 - 123		
Surr: 4-Bromofluorobenzene	48.2	0	50	0	96.4	83 - 122		
Surr: Dibromofluoromethane	45.18	0	50	0	90.4	73 - 126		
Surr: Toluene-d8	48.03	0	50	0	96.1	81 - 119		

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260				
LCS	Sample ID: VLCSW-180515	Units: ug/L			Analysis Date: 15-May-2018 22:51			
Client ID:	Run ID: VOA6_316265	SeqNo: 4562509		PrepDate:	DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
1,1,1-Trichloroethane	42.15	5.0	50	0	84.3	70 - 130		
1,1,2,2-Tetrachloroethane	42.19	5.0	50	0	84.4	70 - 120		
1,1,2-Trichlor-1,2,2-trifluoroethane	41.22	5.0	50	0	82.4	70 - 130		
1,1,2-Trichloroethane	44.34	5.0	50	0	88.7	77 - 113		
1,1-Dichloroethane	43.28	5.0	50	0	86.6	71 - 122		
1,1-Dichloroethene	41.79	5.0	50	0	83.6	70 - 130		
1,2,4-Trichlorobenzene	48.42	5.0	50	0	96.8	77 - 126		
1,2-Dibromo-3-chloropropane	44.85	5.0	50	0	89.7	70 - 130		
1,2-Dibromoethane	46.49	5.0	50	0	93.0	76 - 123		
1,2-Dichlorobenzene	44.49	5.0	50	0	89.0	77 - 113		
1,2-Dichloroethane	42.79	5.0	50	0	85.6	70 - 124		
1,2-Dichloropropane	43.64	5.0	50	0	87.3	72 - 119		
1,3-Dichlorobenzene	43.7	5.0	50	0	87.4	78 - 118		
1,4-Dichlorobenzene	42.81	5.0	50	0	85.6	79 - 113		
2-Butanone	86.86	10	100	0	86.9	70 - 130		
2-Hexanone	83.27	10	100	0	83.3	70 - 130		
4-Methyl-2-pentanone	82.48	10	100	0	82.5	70 - 130		
Acetone	93.15	10	100	0	93.1	70 - 130		
Benzene	44.37	5.0	50	0	88.7	74 - 120		
Bromodichloromethane	44.51	5.0	50	0	89.0	74 - 122		
Bromoform	45.81	5.0	50	0	91.6	73 - 128		
Bromomethane	45.56	5.0	50	0	91.1	70 - 130		
Carbon disulfide	86.49	10	100	0	86.5	70 - 130		
Carbon tetrachloride	41.46	5.0	50	0	82.9	71 - 125		
Chlorobenzene	45.51	5.0	50	0	91.0	76 - 113		
Chloroethane	41.68	5.0	50	0	83.4	70 - 130		
Chloroform	43.77	5.0	50	0	87.5	71 - 121		
Chloromethane	43	5.0	50	0	86.0	70 - 129		
cis-1,2-Dichloroethene	44.92	5.0	50	0	89.8	75 - 122		
cis-1,3-Dichloropropene	45.27	5.0	50	0	90.5	73 - 127		
Cyclohexane	40.21	5.0	50	0	80.4	70 - 130		
Dibromochloromethane	45.64	5.0	50	0	91.3	77 - 122		
Dichlorodifluoromethane	41.07	5.0	50	0	82.1	70 - 130		
Ethylbenzene	43.7	5.0	50	0	87.4	77 - 117		

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260				
LCS	Sample ID: VLCSW-180515	Units: ug/L			Analysis Date: 15-May-2018 22:51			
Client ID:	Run ID: VOA6_316265	SeqNo: 4562509		PrepDate:	DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Isopropylbenzene	42.97	5.0	50	0	85.9	73 - 127		
m,p-Xylene	87.51	10	100	0	87.5	77 - 122		
Methyl acetate	43.04	5.0	50	0	86.1	76 - 122		
Methyl tert-butyl ether	44.69	5.0	50	0	89.4	70 - 130		
Methylcyclohexane	43.65	5.0	50	0	87.3	61 - 157		
Methylene chloride	47.53	10	50	0	95.1	70 - 127		
o-Xylene	44.53	5.0	50	0	89.1	75 - 119		
Styrene	45.19	5.0	50	0	90.4	72 - 126		
Tetrachloroethene	44.1	5.0	50	0	88.2	76 - 119		
Toluene	44.17	5.0	50	0	88.3	77 - 118		
trans-1,2-Dichloroethene	44.46	5.0	50	0	88.9	72 - 127		
trans-1,3-Dichloropropene	45.71	5.0	50	0	91.4	77 - 119		
Trichloroethene	44.4	5.0	50	0	88.8	79 - 120		
Trichlorofluoromethane	41.54	5.0	50	0	83.1	70 - 130		
Vinyl chloride	40.46	2.0	50	0	80.9	70 - 130		
Xylenes, Total	132	5.0	150	0	88.0	75 - 122		
Surr: 1,2-Dichloroethane-d4	41.83	0	50	0	83.7	70 - 130		
Surr: 4-Bromofluorobenzene	47.61	0	50	0	95.2	83 - 122		
Surr: Dibromofluoromethane	44.64	0	50	0	89.3	73 - 126		
Surr: Toluene-d8	47.56	0	50	0	95.1	81 - 119		

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260			
MS	Sample ID: HS18050640-01MS	Units: ug/L		Analysis Date: 16-May-2018 01:43			
Client ID:	Run ID: VOA6_316265	SeqNo: 4562513		PrepDate:	DF: 20		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
1,1,1-Trichloroethane	918.9	100	1000	0	91.9	70 - 130	
1,1,2,2-Tetrachloroethane	905.3	100	1000	0	90.5	70 - 123	
1,1,2-Trichlor-1,2,2-trifluoroethane	901.5	100	1000	0	90.2	70 - 130	
1,1,2-Trichloroethane	948.4	100	1000	0	94.8	70 - 117	
1,1-Dichloroethane	925.4	100	1000	0	92.5	70 - 127	
1,1-Dichloroethene	896.9	100	1000	0	89.7	70 - 130	
1,2,4-Trichlorobenzene	847.9	100	1000	0	84.8	70 - 125	
1,2-Dibromo-3-chloropropane	922.1	100	1000	0	92.2	70 - 130	
1,2-Dibromoethane	991.2	100	1000	0	99.1	70 - 124	
1,2-Dichlorobenzene	919.3	100	1000	0	91.9	70 - 115	
1,2-Dichloroethane	950	100	1000	0	95.0	70 - 127	
1,2-Dichloropropane	974.1	100	1000	0	97.4	70 - 122	
1,3-Dichlorobenzene	917.1	100	1000	0	91.7	70 - 119	
1,4-Dichlorobenzene	900.6	100	1000	0	90.1	70 - 114	
2-Butanone	1857	200	2000	0	92.9	70 - 130	
2-Hexanone	1844	200	2000	0	92.2	70 - 130	
4-Methyl-2-pentanone	1872	200	2000	0	93.6	70 - 130	
Acetone	2072	200	2000	0	104	70 - 130	
Benzene	970.9	100	1000	0	97.1	70 - 127	
Bromodichloromethane	966.4	100	1000	0	96.6	70 - 124	
Bromoform	984.6	100	1000	0	98.5	70 - 129	
Bromomethane	777.4	100	1000	0	77.7	70 - 130	
Carbon disulfide	1867	200	2000	0	93.4	70 - 130	
Carbon tetrachloride	912.1	100	1000	0	91.2	70 - 130	
Chlorobenzene	972	100	1000	0	97.2	70 - 114	
Chloroethane	866.1	100	1000	0	86.6	70 - 130	
Chloroform	941.6	100	1000	0	94.2	70 - 125	
Chloromethane	736.6	100	1000	0	73.7	70 - 130	
cis-1,2-Dichloroethene	974.3	100	1000	0	97.4	70 - 128	
cis-1,3-Dichloropropene	959	100	1000	0	95.9	70 - 125	
Cyclohexane	848.3	100	1000	0	84.8	70 - 130	
Dibromochloromethane	982.8	100	1000	0	98.3	70 - 124	
Dichlorodifluoromethane	753.5	100	1000	0	75.4	70 - 130	
Ethylbenzene	965.9	100	1000	0	96.6	70 - 124	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260				
MS	Sample ID: HS18050640-01MS	Units: ug/L			Analysis Date: 16-May-2018 01:43			
Client ID:	Run ID: VOA6_316265	SeqNo: 4562513		PrepDate:	DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Isopropylbenzene	925.3	100	1000	0	92.5	70 - 130		
m,p-Xylene	1901	200	2000	0	95.1	70 - 130		
Methyl acetate	914.2	100	1000	0	91.4	76 - 122		
Methyl tert-butyl ether	943.7	100	1000	0	94.4	70 - 130		
Methylcyclohexane	873.8	100	1000	0	87.4	61 - 158		
Methylene chloride	1042	200	1000	0	104	70 - 128		
o-Xylene	975.2	100	1000	0	97.5	70 - 124		
Styrene	970.7	100	1000	0	97.1	70 - 130		
Tetrachloroethene	951.1	100	1000	0	95.1	70 - 130		
Toluene	960.8	100	1000	0	96.1	70 - 123		
trans-1,2-Dichloroethene	959.9	100	1000	0	96.0	70 - 130		
trans-1,3-Dichloropropene	977.5	100	1000	0	97.7	70 - 121		
Trichloroethene	965.6	100	1000	0	96.6	70 - 129		
Trichlorofluoromethane	816.4	100	1000	0	81.6	70 - 130		
Vinyl chloride	821.9	40	1000	0	82.2	70 - 130		
Xylenes, Total	2876	100	3000	0	95.9	70 - 130		
Surr: 1,2-Dichloroethane-d4	846.5	0	1000	0	84.7	70 - 126		
Surr: 4-Bromofluorobenzene	966.6	0	1000	0	96.7	82 - 124		
Surr: Dibromofluoromethane	905.6	0	1000	0	90.6	77 - 123		
Surr: Toluene-d8	949.9	0	1000	0	95.0	82 - 127		

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260					
MSD	Sample ID: HS18050640-01MSD	Units: ug/L		Analysis Date: 16-May-2018 02:08					
Client ID:	Run ID: VOA6_316265	SeqNo: 4562514		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1,1-Trichloroethane	844.6	100	1000	0	84.5	70 - 130	918.9	8.42	20
1,1,2,2-Tetrachloroethane	858.1	100	1000	0	85.8	70 - 123	905.3	5.35	20
1,1,2-Trichlor-1,2,2-trifluoroethane	831.2	100	1000	0	83.1	70 - 130	901.5	8.12	20
1,1,2-Trichloroethane	905	100	1000	0	90.5	70 - 117	948.4	4.68	20
1,1-Dichloroethane	867.4	100	1000	0	86.7	70 - 127	925.4	6.47	20
1,1-Dichloroethene	819.7	100	1000	0	82.0	70 - 130	896.9	9	20
1,2,4-Trichlorobenzene	965.8	100	1000	0	96.6	70 - 125	847.9	13	20
1,2-Dibromo-3-chloropropane	935	100	1000	0	93.5	70 - 130	922.1	1.39	20
1,2-Dibromoethane	943.9	100	1000	0	94.4	70 - 124	991.2	4.89	20
1,2-Dichlorobenzene	918.2	100	1000	0	91.8	70 - 115	919.3	0.111	20
1,2-Dichloroethane	871.6	100	1000	0	87.2	70 - 127	950	8.61	20
1,2-Dichloropropane	900.6	100	1000	0	90.1	70 - 122	974.1	7.84	20
1,3-Dichlorobenzene	912.7	100	1000	0	91.3	70 - 119	917.1	0.479	20
1,4-Dichlorobenzene	895.3	100	1000	0	89.5	70 - 114	900.6	0.587	20
2-Butanone	1754	200	2000	0	87.7	70 - 130	1857	5.72	20
2-Hexanone	1727	200	2000	0	86.4	70 - 130	1844	6.51	20
4-Methyl-2-pentanone	1691	200	2000	0	84.5	70 - 130	1872	10.1	20
Acetone	1911	200	2000	0	95.6	70 - 130	2072	8.04	20
Benzene	907.8	100	1000	0	90.8	70 - 127	970.9	6.72	20
Bromodichloromethane	917.3	100	1000	0	91.7	70 - 124	966.4	5.2	20
Bromoform	931.3	100	1000	0	93.1	70 - 129	984.6	5.57	20
Bromomethane	959.6	100	1000	0	96.0	70 - 130	777.4	21	20
Carbon disulfide	1706	200	2000	0	85.3	70 - 130	1867	9.02	20
Carbon tetrachloride	844.1	100	1000	0	84.4	70 - 130	912.1	7.74	20
Chlorobenzene	930.9	100	1000	0	93.1	70 - 114	972	4.32	20
Chloroethane	791.9	100	1000	0	79.2	70 - 130	866.1	8.96	20
Chloroform	887	100	1000	0	88.7	70 - 125	941.6	5.97	20
Chloromethane	757.4	100	1000	0	75.7	70 - 130	736.6	2.78	20
cis-1,2-Dichloroethene	916.1	100	1000	0	91.6	70 - 128	974.3	6.15	20
cis-1,3-Dichloropropene	921	100	1000	0	92.1	70 - 125	959	4.04	20
Cyclohexane	787.2	100	1000	0	78.7	70 - 130	848.3	7.47	20
Dibromochloromethane	948.2	100	1000	0	94.8	70 - 124	982.8	3.58	20
Dichlorodifluoromethane	695.1	100	1000	0	69.5	70 - 130	753.5	8.07	20
Ethylbenzene	917.8	100	1000	0	91.8	70 - 124	965.9	5.1	20

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316265		Instrument: VOA6		Method: SW8260					
MSD	Sample ID: HS18050640-01MSD	Units: ug/L		Analysis Date: 16-May-2018 02:08					
Client ID:	Run ID: VOA6_316265	SeqNo: 4562514		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Isopropylbenzene	893.6	100	1000	0	89.4	70 - 130	925.3	3.49	20
m,p-Xylene	1828	200	2000	0	91.4	70 - 130	1901	3.94	20
Methyl acetate	855.4	100	1000	0	85.5	76 - 122	914.2	6.65	20
Methyl tert-butyl ether	887.1	100	1000	0	88.7	70 - 130	943.7	6.18	20
Methylcyclohexane	707	100	1000	0	70.7	61 - 158	873.8	21.1	20
Methylene chloride	966.9	200	1000	0	96.7	70 - 128	1042	7.52	20
o-Xylene	925.6	100	1000	0	92.6	70 - 124	975.2	5.22	20
Styrene	935.7	100	1000	0	93.6	70 - 130	970.7	3.67	20
Tetrachloroethene	898.2	100	1000	0	89.8	70 - 130	951.1	5.72	20
Toluene	922.3	100	1000	0	92.2	70 - 123	960.8	4.1	20
trans-1,2-Dichloroethene	879	100	1000	0	87.9	70 - 130	959.9	8.8	20
trans-1,3-Dichloropropene	918.5	100	1000	0	91.8	70 - 121	977.5	6.22	20
Trichloroethene	899.2	100	1000	0	89.9	70 - 129	965.6	7.13	20
Trichlorofluoromethane	774.2	100	1000	0	77.4	70 - 130	816.4	5.31	20
Vinyl chloride	754.2	40	1000	0	75.4	70 - 130	821.9	8.59	20
Xylenes, Total	2753	100	3000	0	91.8	70 - 130	2876	4.37	20
Surr: 1,2-Dichloroethane-d4	804.8	0	1000	0	80.5	70 - 126	846.5	5.05	20
Surr: 4-Bromofluorobenzene	942.5	0	1000	0	94.3	82 - 124	966.6	2.52	20
Surr: Dibromofluoromethane	860.1	0	1000	0	86.0	77 - 123	905.6	5.15	20
Surr: Toluene-d8	933	0	1000	0	93.3	82 - 127	949.9	1.8	20

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R315920		Instrument: WetChem_HS		Method: SM4500H+ B			
DUP	Sample ID: HS18050382-01DUP	Units: pH Units		Analysis Date: 09-May-2018 17:07			
Client ID:		Run ID: WetChem_HS_315920	SeqNo: 4553977	PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
pH	7.11	0.100				7.2	1.26 10
Temp Deg C @pH	20.9	0				20.9	0 10

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316018		Instrument: WetChem_HS		Method: SW1010			
LCS	Sample ID: LCS-R316018	Units: °F		Analysis Date: 11-May-2018 11:00			
Client ID:		Run ID: WetChem_HS_316018	SeqNo: 4556530	PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Ignitability	82.6	70.0	81	0	102	95 - 105	RPD Limit Qual
DUP	Sample ID: HS18050375-01DUP	Units: °F		Analysis Date: 11-May-2018 11:00			
Client ID:		Run ID: WetChem_HS_316018	SeqNo: 4556531	PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Ignitability	128.6	70.0				127.6	0.781 20

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316222		Instrument: WetChem_HS		Method: SW7.3.4.2					
MLBK	Sample ID: MBLK-316222			Units: mg/Kg		Analysis Date: 15-May-2018 16:01			
Client ID:		Run ID: WetChem_HS_316222	SeqNo: 4561307	PrepDate:					DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Reactive Sulfide	ND	100							
LCS	Sample ID: LCS-316222			Units: mg/Kg		Analysis Date: 15-May-2018 16:01			
Client ID:		Run ID: WetChem_HS_316222	SeqNo: 4561308	PrepDate:					DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Reactive Sulfide	64	10.0	100	0	64.0	20 - 120			
MS	Sample ID: HS18050502-01MS			Units: mg/Kg		Analysis Date: 15-May-2018 16:01			
Client ID:		Run ID: WetChem_HS_316222	SeqNo: 4561310	PrepDate:					DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Reactive Sulfide	52	10.0	100	8	44.0	20 - 120			

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316225	Instrument: UV-2450	Method: SW7.3.3.2
--------------------------	----------------------------	--------------------------

MLBK	Sample ID:	MLBK-316225	Units:	mg/Kg	Analysis Date: 15-May-2018 16:11			
Client ID:	Run ID:	UV-2450_316225	SeqNo:	4561340	PrepDate:	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Reactive Cyanide	ND	100						

LCS	Sample ID:	LCS-316225	Units:	mg/Kg	Analysis Date: 15-May-2018 16:11			
Client ID:	Run ID:	UV-2450_316225	SeqNo:	4561341	PrepDate:	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Reactive Cyanide	0.62	10.0	10	0	6.20	5 - 100		J

MS	Sample ID:	HS18050502-01MS	Units:	mg/Kg	Analysis Date: 15-May-2018 16:11			
Client ID:	Run ID:	UV-2450_316225	SeqNo:	4561343	PrepDate:	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Reactive Cyanide	0.62	10.0	10	0.01	6.10	5 - 100		J

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

QC BATCH REPORT

Batch ID: R316413		Instrument: WetChem_HS		Method: E180.1			
MLBK	Sample ID: MBLK-R316413		Units: NTU	Analysis Date: 09-May-2018 19:40			
Client ID:		Run ID: WetChem_HS_316413	SeqNo: 4566003	PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Turbidity	ND	1.00					RPD Limit Qual
LCS	Sample ID: LCS-R316413		Units: NTU	Analysis Date: 09-May-2018 19:40			
Client ID:		Run ID: WetChem_HS_316413	SeqNo: 4566002	PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Turbidity	10.8	1.00	10	0	108	90 - 110	RPD Limit Qual
DUP	Sample ID: HS18050449-01DUP		Units: NTU	Analysis Date: 09-May-2018 19:40			
Client ID: 191-082		Run ID: WetChem_HS_316413	SeqNo: 4566004	PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %RPD
Turbidity	75	10.0					RPD Limit Qual

The following samples were analyzed in this batch: HS18050449-01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Sasol Chemicals (USA) LLC
Project: T605 Annual CY2018
WorkOrder: HS18050449

**QUALIFIERS,
ACRONYMS, UNITS**

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
°F	Farenheit degrees
mg/L	Milligrams per Liter
NTU	
pH units	

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
California	2919 2016-2018	31-Jul-2018
Oklahoma	2017-088	31-Aug-2018
North Carolina	624-2018	31-Dec-2018
Louisiana	03087 2017-2018	30-Jun-2018
Arkansas	88-0356	27-Mar-2019
Kansas	E-10352 2017-218	31-Jul-2018

Sample Receipt Checklist

Client Name: SASOL 77079 Date/Time Received: 08-May-2018 13:37
 Work Order: HS18050449 Received by: PS

Checklist completed by:	<u>Paresh M. Giga</u> eSignature	9-May-2018 Date	Reviewed by:	<u>Corey Grandits</u> eSignature	9-May-2018 Date
-------------------------	-------------------------------------	--------------------	--------------	-------------------------------------	--------------------

Matrices: Aqueous Carrier name: ALS Courier

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
TX1005 solids received in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s): 0.7c/0.3c U/c | IR30

Cooler(s)/Kit(s): 43815

Date/Time sample(s) sent to storage: 5/8/18 19:00

Water - VOA vials have zero headspace? Yes No No VOA vials submitted

Water - pH acceptable upon receipt? Yes No N/A

pH adjusted? Yes No N/A

pH adjusted by: Si Ma

Login Notes: Metals pH received at >2, sample container preserved with 0.25ml HNO3 5/9/18 @ 09:50.

Client Contacted: _____ Date Contacted: _____ Person Contacted: _____

Contacted By: _____ Regarding: _____

Comments: _____

Corrective Action: _____



Environmental

ALS Laboratory Group
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of Custody Form

Page 1 of 1

COC ID: 140176

- Cincinnati - 151
- Everett - 141
- Fort Lauderdale - 19

HS18050449

Sasol Chemicals (USA) LLC
T605 Annual CY2018



ALS Project Manager:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	9100009753	Project Name	T605 Annual CY2018	A	VOC (TCL Volatiles - SW8260C)
Work Order		Project Number		B	SVOC - SW8270D
Company Name	Sasol Chemicals (USA) LLC	Bill To Company	Sasol Chemicals (USA) LLC	C	RCRA 8+3
Send Report To	Rod Batts	Invoice Attn.	Accounts Payable	D	Reactivity / Flashpt
Address	1914 Haden Road	Address	P.O. Box 19029	E	pH/Turbidity
City/State/Zip	Houston TX 77015-6498	City/State/Zip	Houston, TX 77224-9029	G	
Phone	(832) 783-6647	Phone	(281) 588-3379	H	
Fax	(713) 428-5603	Fax		I	
e-Mail Address	rod.batts@us.sasol.com	e-Mail Address	accountspayable@us.sasol.com	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	#1-191-082	5/8/2018	7:00am	Aqueous	1	3x40mL	X										
2	#2-191-082	5/8/2018	7:00am	Aqueous	Neat	2 x 1 Lt		X									
3	#3-191-082	5/8/2018	7:00am	Aqueous	2	60 mL			X								
4	#4-191-082	5/8/2018	7:00am	Aqueous	Neat	500mL				X							
5	#5-191-082	5/8/2018	7:00am	Aqueous	Neat	250mL					X						
6	#6-191-082	5/8/2018	7:00am	Aqueous	1	3x40mL						X					
7																	
8																	
9																	
10																	

Sampler(s): Please Print & Sign		Shipment Method:	Required Turnaround Time:	Other	Results Due Date:		
<i>Jane Ji</i>		<i>CO</i>	<input checked="" type="checkbox"/> STD 7 Wk Days	<input type="checkbox"/> 5 Wk Days	<input type="checkbox"/> 2 Wk Days	<input type="checkbox"/> 24 Hour	
Relinquished by:		Date: <i>5/8/18</i>	Time: <i>7 am</i>	Received by: <i>Randy Shilling</i>	Notes: Include in email randy.shilling@us.sasol.com		
Relinquished by: <i>Jane Ji</i>		Date: <i>5/8/18</i>	Time: <i>7:357</i>	Received by (Laboratory): <i>Jane Ji</i>	QC Package: (Check Box Below)		
Logged by (Laboratory): <i>Jane Ji</i>		Date: <i>5/8/18</i>	Time: <i>7:357</i>	Checked by (Laboratory): <i>Jane Ji</i>	Cooler Temp: <i>41C</i>	Level II: Standard QC	TRRP Checklist
					<input checked="" type="checkbox"/> 0.7	Level III: Std QC + Raw Data	TRRP Level IV
						Level IV: SW846 CLP-Like	
						Other:	

Preservative Key: 1-HCL 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4 degrees C 9-5035

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental. *3/24/18* Copyright 2011 by ALS Environmental

43815 WF-04

 <p>ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887</p>	<p>CUSTODY SEAL</p> <table border="1"><tr><td>Date: <u>5/08/18</u></td><td>Time: <u>10am</u></td></tr><tr><td>Name: <u>Jone J.</u></td><td>Company: <u>Sasol Chemical USA</u></td></tr></table>	Date: <u>5/08/18</u>	Time: <u>10am</u>	Name: <u>Jone J.</u>	Company: <u>Sasol Chemical USA</u>	<p>Seal Broken By: <u>SM</u></p> <p>Date: <u>05/08/18</u></p>
Date: <u>5/08/18</u>	Time: <u>10am</u>					
Name: <u>Jone J.</u>	Company: <u>Sasol Chemical USA</u>					

43815 MAY 08 2018

APPENDIX 6-2
SASOL CHEMICALS (USA), LLC
SPECIFIC GRAVITY MEASUREMENT
PROCEDURES

APPENDIX 6-2

SPECIFIC GRAVITY MEASUREMENT PROCEDURES

APPENDIX 6-2	1
Introduction to Appendix 6-3.....	2
6-2.1 Specific Gravity Measurement.....	2
6-2.2 Mass Density Monitoring.....	3

Introduction to Appendix 6-2

Sasol Chemicals (USA), LLC Greens Bayou Plant utilizes an onsite laboratory to measure specific gravity and mass density of the waste stream generated by manufacturing processes of raw materials. The following sections detail the processes used to measure the specific gravity of the waste stream on a daily basis.

6-2.1 Specific Gravity Measurement

A sample of the waste brine is collected daily, and specific gravity is measured in the onsite Sasol Chemicals (USA), LLC Greens Bayou Plant laboratory using a Kessler Hydrometer (range of the two hydrometers at 20°C is 1.000 – 1.200 graduated into units of specific gravity, divided into 0.0002 intervals). The waste effluent sample is poured into a glass cylinder having an inside diameter of at least one inch greater than the largest diameter of the hydrometer, and deep enough that the hydrometer floats at least one inch from the bottom of the cylinder. After removal of froth, or air bubbles, the cylinder is placed in a bath adjusted to the desired temperature, and after the stirred brine sample reaches thermal equilibrium as read by a Kessler thermometer ASTM 36C (range = 2°C to 68°C) read to the nearest 0.1°C, the thermometer is removed, and the hydrometer inserted. Reproducibility over the range 29°F to 76°F is 0.0012 for the procedure (see ASTM D-1298).

6-2.2 Mass Density Monitoring

Brine to both injection well is also metered through a Coriolis-type mass meter that continuously measures flow rate, temperature, and density. The mass density monitoring is used by Sasol for quality assurance/quality control on the wastewater. The Micro Motion CMF 300 sensor with RFT9739D transmitter stores data electronically in a GE9030 processor for subsequent data retrieval. Mass Flow accuracy is 0.11 percent of rate (162 – 400 gpm); and density accuracy is 0.5000 kg/m³ at all rates. Flow rate accuracy decreases to 0.12% at 123 gpm, 0.13 percent at 83 gpm, 0.16 percent at 44 gpm, and 0.70 percent at 4 gpm.

Temperature effects on density (measured values) versus the permit regulatory limits (at 68°F) are less than 1 percent. The mass density and mass flow rate are automatically compensated for the measured temperature of the injected waste. Temperature sensor accuracy is $\pm 1^{\circ}\text{C}$ or $\pm 0.5\%$ of the reading in $^{\circ}\text{C}$. Thus, for an actual waste temperature of 40°C (104°F), accuracy of the sensor would be $\pm 1^{\circ}\text{C}$, $\pm 0.2^{\circ}\text{C}$, or $\pm 1.2^{\circ}\text{C}$ ($\pm 2.2^{\circ}\text{F}$). The micro motion meter is not affected by viscosity differences, and since the meter is calibrated in the field for the mid-range of injected waste temperature, temperature effects upon density and mass flow are insignificant.

Since pockets of air bubbles or suspended solids in the injected waste can create instantaneous fluctuations in the mass density measurement, fluctuation outside a specific gravity range of 1.000 to 1.200 create an alarm condition requiring operator investigation. If these conditions persist for over a 30-minute time period, the processor automatically shuts down the primary injection pump.

APPENDIX 6-3

SASOL CHEMICAL (USA), LLC

**WASTE STREAM SPECIFIC GRAVITY
COMPLIANCE PROGRAM**

APPENDIX 6-3
WASTE STREAM SPECIFIC GRAVITY COMPLIANCE PROGRAM

APPENDIX 6-3	1
Introduction to Appendix 6-3.....	2
6-3.1 Waste Streams and Sampling.....	2
6-3.1.1 Specific Gravity Measurement	3
6-3.1.2 Daily Well Flow Measurements	3
6-3.2 Calculation Methodology Three-Whole Calendar Month Volume Weighted Average Specific Gravity.....	4

Introduction to Appendix 6-3

Sasol Chemicals (USA), LLC Greens Bayou Plant is requesting that Condition No. 4 read as follows:

“The characteristics of the injected waste stream shall at all times conform to those described in the 2000 request for petition reissuance. The specific gravity of the injected waste shall be based on a three-whole calendar month volume weighted average specific gravity range of 1.000 to 1.200 at 20°C/20°C. The three-month average shall be calculated by multiplying each day’s specific gravity value by that day’s injected volume, totaling those values for the previous three-whole calendar month period, and dividing that three-month injected volume. Each day’s specific gravity value shall be obtained by at least one representative grab sample.”

Waste stream specific gravity compliance monitoring will be conducted in each active injection interval following this *Waste Stream Specific Gravity Compliance Program*. The program is designed to independently monitor compliance in each active injection interval.

In the modeling conceptualization, for the long-term modeling, the entire plume specific gravity is assumed to be at the running three-month specific gravity value end member value for each of the cases modeled (high specific gravity case and low specific gravity case). This assumption discounts any historical specific gravity variations in the wastes injected into each of the active wells. The long-term models solve the flow and transport equations for a single isolated plume. Therefore, in applying the present model to a multi-well injection site, such as at the Greens Bayou Plant, the plumes from the various wells are lumped together into a single “composite” circular plume. Consistent with this model assumption employed in this reissuance request, the calculation of the running three-whole calendar month volume weighted average density will be calculated as a “composite” in each active injection.

6-3.1 Waste Streams and Sampling

Injected waste from the manufacturing processes are contained in a filtered water storage tank (T-605). The injection stream to the wells is a single composite stream. Therefore, the specific gravity sample is measured from this combined filtered waste. Specific Gravity measurement procedures

are detailed in Appendix 6-2. At a minimum, to ensure compliance with this reissuance request, one representative sample will be obtained when any well is active, even if active for only a portion of a calendar day.

6-3.1.1 Specific Gravity Measurement

Specific gravity measurement equipment and procedures at the Sasol Chemicals (USA), LLC Greens Bayou Plant are included as Appendix 6-2. The method uses a hydrometer and the attached procedures show the correction to a reference temperature of 20°C, which is the reference temperature used in this 2020 HWDIR Exemption Petition Reissuance request. Since the injection stream to both the wells is a single composite from the filtered water storage tank (T-605), sampling of each individual process stream is not required. Specific gravity will continue to be measured at least once per day.

6-3.1.2 Daily Well Flow Measurements

The flow rate to each well is recorded and integrated to maintain a cumulative record of the total aqueous waste injected. Flow to each well that is active during a calendar day will be accumulated to the daily volume total.

6-3.2 Calculation Methodology Three-Whole Calendar Month Volume Weighted Average Specific Gravity

An example calculation worksheet for the injected waste stream is included as Attachment A to this appendix. The worksheets are included as a computation example and use site data from August 2001 through December 2018.

Following the referenced calculation methodology in this appendix, the three-whole calendar month volume weighted average specific gravity will be calculated for a cumulative injection volume for both the Frio E and F Injection Interval and Frio A/B/C Injection Interval. This will be accomplished by determining the individual monthly volume weighted average specific gravity for the wells injecting or potentially injecting at the Greens Bayou Plant. Plant Well No. 1 (WDW147) is completed in the Frio E and F Sand Injection Interval and Plant Well No. 2 (WDW319) is completed in the Frio A/B/C Sand Injection Interval.

Note that the spreadsheet is “sectioned”. The average daily specific gravity is presented in Column 3 and the daily well injection volume is cumulated and presented in Column 4. Additional waste injection wells could be added to the calculation sheets on an “ad hoc” basis, by summing the individual well volumes to a total daily well volume.

Daily Volume

The daily volume injected (Vol_{Daily}) at the Greens Bayou Plant is currently calculated as follows:

$$Vol_{Daily} = \sum (Vol_{Well\ 1} + Vol_{Well\ 2})$$

Where:

$Vol_{Well\ 1}$ = Daily Volume injected into Well 1 (WDW147)

$Vol_{Well\ 2}$ = Daily Volume injected into Well 2 (WDW319)

Daily Volume x Specific Gravity Product

The daily “Volume x Specific Gravity” at the Greens Bayou Plant is calculated as follows:

$$Vol_{Daily} \times SG = \sum (Vol_{Well\ 1} + Vol_{Well\ 2}) \times SG$$

Where:

VolWell 1 = Daily Volume injected into Well 1 (WDW147)

VolWell 2 = Daily Volume injected into Well 2 (WDW319)

SG = Daily average specific gravity of injection stream at 20 °C/20 °C

Since all wells take a common well feed, the specific gravity value applies to all wells. For the above calculation, each day’s waste stream specific gravity shall be obtained by at least one representative grab sample.

The calculated monthly volume weighted specific gravity and three-whole calendar month volume weighted specific gravity calculation are presented below.

Monthly Volume Weighted Average Specific Gravity

In the previous calculation, the sum of the product of each calendar day’s injection volume multiplied by the measured daily specific gravity (measured at 20°C/20°C reference temperature), even if the wells injected for only a portion of that calendar day. In the presented calculation example, the daily “volume x specific gravity” is then the sum of Column 4 and Column 3. This sum, on a calendar basis, is present in Column 5 (see Attachment A).

The cumulative monthly sum of the daily “volume x specific gravity” product for the Greens Bayou Plant is presented in Column 7 for the last calendar day in each month (see Attachment A). The sum of these daily “volume x specific gravity” products for each month (Column 7) will then be divided by the total monthly sum of each day’s injection volume, which is presented in Column

6 on the last day of the month. This results in that month's Volume Weighted Specific Gravity (MVSG) value, present on the last day of each month in Column 8. Or as follows:

$$\text{Monthly Volume Weighted Specific Gravity} = \frac{\sum_{\text{First Day}}^{\text{Last Day}} \text{Vol} \times SG}{\sum_{\text{First Day}}^{\text{Last Day}} \text{Vol}}$$

In the sample calculation (Attachment A), the volume weighted specific gravity at the end of December 2018 is a calculated value of 1.067 (monthly cumulative volume * SG value of 6,750,966 divided by monthly cumulative volume of 6,327,411).

In the final step in the sample calculation, the initial three-whole calendar month running average base period for the example is set from January 31, 2018 to March 31, 2010, with the initial three-whole calendar month volume weighted average specific gravity range calculated starting at the end of March 2018 for the months of January 2018, February 2018, and March 2018 (Column 8):

Three – Whole Calendar Month Volume Weighted SG

$$= \frac{[\text{MVWSG}_{\text{January}} + \text{MVWSG}_{\text{February}} + \text{MVWSG}_{\text{March}}]}{3}$$

Where:

- MVWSG_{January} = Monthly Volume Weighted Specific Gravity for January
- MVWSG_{February} = Monthly Volume Weighted Specific Gravity for February
- MVWSG_{March} = Monthly Volume Weighted Specific Gravity for March

In the example (Attachment A), for the initial three-month period, the calculated three-whole calendar month volume weighted specific gravity value is 1.073 at the Greens Bayou Plant ((1.064+1.085+1.070)/3 = 1.073).

For each subsequent month in the example (*i.e.*, from April 2018 through September 2018), the running three-whole calendar month average is recalculated by adding the new month's value and

dropping the initial (first) month's value, successively (see Column 10). The resulting graph of the calculation from August 2001 through December 2018, results are presented in relation to the conditioned specific gravity range of 1.000 - 1.200 and is shown in the figure located ahead of the computation summary spreadsheet (Attachment A).

ATTACHMENT A
EXAMPLE CALCULATION WORKSHEET

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

Three-Whole Calendar Month Volume Weighted Specific Gravity Calculations

1 Date	2 Calculated Injection Rate	3 Average Daily SG	4 Daily Volume Wells 1 & 2 (gallons)	5 Daily Calculated Volume*SG	6 Cumulative Monthly Volume	7 Cumulative Monthly Volume*SG	8 Monthly Volume Weighted SG	9 Three Month Cumulative Volume	10 Three Month Cumulative Volume*SG	11 Three Month Running SG
8/1/2001	152.5	1.118	219,614	245,528.1						
8/2/2001	267.9	1.102	385,771	425,119.6						
8/3/2001	290.0	1.097	417,575	458,079.3						
8/4/2001	293.4	1.100	422,511	464,762.6						
8/5/2001	298.4	1.095	429,633	470,448.5						
8/6/2001	295.0	1.106	424,796	469,620.1						
8/7/2001	287.7	1.113	414,321	461,139.2						
8/8/2001	235.9	1.112	339,671	377,714.1						
8/9/2001	266.2	1.099	383,260	421,203.1						
8/10/2001	256.7	1.103	369,652	407,725.9						
8/11/2001	250.7	1.099	361,022	396,763.1						
8/12/2001	252.5	1.096	363,600	398,505.1						
8/13/2001	207.9	1.107	299,396	331,431.9						
8/14/2001	255.6	1.100	368,073	404,880.5						
8/15/2001	255.7	1.103	368,224	406,151.2						
8/16/2001	260.0	1.120	374,433	419,364.5						
8/17/2001	266.4	1.111	383,599	426,178.6						
8/18/2001	265.4	1.111	382,246	424,675.2						
8/19/2001	264.5	1.111	380,928	423,211.4						
8/20/2001	280.6	1.111	404,111	448,967.7						
8/21/2001	287.7	1.113	414,335	461,155.4						
8/22/2001	285.0	1.109	410,452	455,190.8						
8/23/2001	256.1	1.113	368,797	410,471.5						
8/24/2001	241.7	1.104	348,010	384,202.8						
8/25/2001	247.5	1.105	356,391	393,812.0						
8/26/2001	271.2	1.114	390,586	435,040.4						
8/27/2001	290.0	1.091	417,634	455,638.2						
8/28/2001	231.1	1.097	332,721	364,994.5						
8/29/2001	270.0	1.093	388,744	424,896.9						
8/30/2001	282.4	1.085	406,619	441,181.8						
8/31/2001	265.8	1.098	382,734	420,241.4	11,709,458	12,928,295	1.104			
9/1/2001	285.9	1.087	411,691	447,507.6						
9/2/2001	287.9	1.096	414,639	454,444.7						
9/3/2001	288.0	1.097	414,780	455,013.9						
9/4/2001	289.2	1.099	416,379	457,600.1						
9/5/2001	291.8	1.095	420,170	460,085.9						
9/6/2001	290.1	1.094	417,777	457,048.2						
9/7/2001	285.8	1.090	411,597	448,641.1						
9/8/2001	287.8	1.092	414,408	452,533.4						
9/9/2001	288.8	1.097	415,923	456,267.1						
9/10/2001	280.6	1.098	404,086	443,686.8						
9/11/2001	277.2	1.083	399,139	432,268.1						
9/12/2001	274.0	1.093	394,585	431,281.0						
9/13/2001	274.5	1.089	395,346	430,531.8						
9/14/2001	280.2	1.084	403,522	437,417.7						
9/15/2001	274.9	1.095	395,820	433,422.4						
9/16/2001	268.4	1.088	386,459	420,467.9						
9/17/2001	225.2	1.099	324,282	356,385.6						
9/18/2001	266.9	1.099	384,306	422,352.6						
9/19/2001	271.7	1.090	391,281	426,496.5						
9/20/2001	273.8	1.088	394,291	428,988.7						
9/21/2001	266.9	1.091	384,348	419,323.5						
9/22/2001	284.1	1.090	409,161	445,985.7						
9/23/2001	286.6	1.118	412,774	461,480.8						
9/24/2001	279.3	1.105	402,225	444,458.4						
9/25/2001	73.5	1.114	105,900	117,973.0						
9/26/2001	0.0	1.096	14	14.8						
9/27/2001	34.7	1.102	50,032	55,114.4						
9/28/2001	280.9	1.112	404,489	449,792.1						
9/29/2001	288.7	1.098	415,785	456,531.8						
9/30/2001	277.8	1.093	400,078	437,285.3	10,995,286	12,040,401	1.095			

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2001	264.5	1.109	380,858	422,371.0						
10/2/2001	269.9	1.104	388,717	429,143.2						
10/3/2001	273.6	1.095	394,034	431,467.8						
10/4/2001	280.1	1.095	403,275	441,586.4						
10/5/2001	278.9	1.099	401,629	441,389.9						
10/6/2001	272.9	1.098	393,048	431,566.4						
10/7/2001	283.4	1.099	408,044	448,440.8						
10/8/2001	290.0	1.102	417,529	460,116.9						
10/9/2001	272.4	1.107	392,228	434,196.9						
10/10/2001	275.8	1.110	397,193	440,884.5						
10/11/2001	280.0	1.104	403,184	445,115.1						
10/12/2001	282.1	1.103	406,160	447,994.1						
10/13/2001	285.0	1.101	410,363	451,809.7						
10/14/2001	285.0	1.089	410,468	446,999.3						
10/15/2001	285.0	1.103	410,352	452,634.7						
10/16/2001	59.6	1.098	85,841	94,268.9						
10/17/2001	0.4	1.099	574	630.6						
10/18/2001	271.1	1.084	390,368	423,159.3						
10/19/2001	273.0	1.101	393,080	432,781.6						
10/20/2001	287.5	1.099	414,018	455,005.3						
10/21/2001	289.3	1.100	416,637	458,300.5						
10/22/2001	288.4	1.100	415,335	456,868.4						
10/23/2001	229.0	1.100	329,732	362,731.2						
10/24/2001	163.2	1.099	234,977	258,239.8						
10/25/2001	0.0	1.102	14	14.9						
10/26/2001	141.3	1.096	203,510	223,123.1						
10/27/2001	258.7	1.102	372,563	410,564.5						
10/28/2001	240.0	1.091	345,569	377,015.5						
10/29/2001	261.3	1.094	376,279	411,649.7						
10/30/2001	213.6	1.103	307,598	339,280.8						
10/31/2001	202.0	1.104	290,836	321,083.1	10,594,013	11,650,434	1.100	33,298,757	36,619,130	1.100
11/1/2001	232.8	1.104	335,188	370,047.1						
11/2/2001	286.5	1.094	412,551	451,330.5						
11/3/2001	290.0	1.098	417,567	458,488.1						
11/4/2001	289.8	1.095	417,380	457,031.2						
11/5/2001	285.0	1.103	410,422	452,695.1						
11/6/2001	226.2	1.092	325,719	355,684.8						
11/7/2001	223.9	1.101	322,378	354,938.6						
11/8/2001	264.1	1.098	380,342	417,615.1						
11/9/2001	210.4	1.093	302,930	331,102.3						
11/10/2001	274.9	1.112	395,814	440,145.6						
11/11/2001	264.5	1.103	380,867	420,096.5						
11/12/2001	263.0	1.100	378,790	416,668.9						
11/13/2001	241.3	1.100	347,453	382,198.1						
11/14/2001	181.9	1.109	261,903	290,450.2						
11/15/2001	265.6	1.120	382,464	428,359.6						
11/16/2001	290.0	1.119	417,650	467,349.9						
11/17/2001	293.7	1.114	422,920	471,133.4						
11/18/2001	275.1	1.098	396,103	434,921.4						
11/19/2001	260.8	1.088	375,506	408,550.8						
11/20/2001	257.7	1.088	371,116	403,773.7						
11/21/2001	284.4	1.092	409,577	447,258.4						
11/22/2001	283.1	1.098	407,700	447,654.2						
11/23/2001	266.5	1.093	383,776	419,467.5						
11/24/2001	286.3	1.111	412,232	457,989.4						
11/25/2001	285.0	1.092	410,354	448,106.6						
11/26/2001	285.1	1.101	410,476	451,934.0						
11/27/2001	266.7	1.118	384,110	429,434.5						
11/28/2001	286.2	1.101	412,106	453,729.2						
11/29/2001	200.8	1.099	289,189	317,818.6						
11/30/2001	130.9	1.090	188,428	205,387.0	11,163,009	12,291,360	1.101	32,752,308	35,982,195	1.099

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2001	190.1	1.106	273,783	302,803.7						
12/2/2001	290.9	1.100	418,967	461,050.2						
12/3/2001	283.2	1.109	407,762	452,207.5						
12/4/2001	160.1	1.095	230,491	252,387.3						
12/5/2001	276.4	1.089	397,992	433,413.7						
12/6/2001	295.8	1.094	425,922	465,958.6						
12/7/2001	272.3	1.096	392,171	429,819.4						
12/8/2001	270.3	1.090	389,262	424,295.6						
12/9/2001	278.5	1.092	400,985	437,875.2						
12/10/2001	282.4	1.087	406,677	442,057.8						
12/11/2001	297.3	1.096	428,171	469,276.0						
12/12/2001	300.3	1.094	432,403	473,049.4						
12/13/2001	301.9	1.102	434,797	479,146.0						
12/14/2001	296.5	1.195	426,979	510,240.5						
12/15/2001	287.1	1.112	413,360	459,656.0						
12/16/2001	291.9	1.115	420,385	468,729.5						
12/17/2001	291.9	1.096	420,348	460,701.5						
12/18/2001	294.1	1.096	423,480	464,133.8						
12/19/2001	180.3	1.112	259,670	288,752.9						
12/20/2001	272.3	1.107	392,171	434,133.2						
12/21/2001	90.6	1.107	130,483	144,444.3						
12/22/2001	211.4	1.110	304,424	337,910.7						
12/23/2001	273.1	1.101	393,276	432,997.0						
12/24/2001	272.4	1.093	392,238	428,716.0						
12/25/2001	285.0	1.096	410,362	449,757.2						
12/26/2001	278.1	1.095	400,410	438,448.5						
12/27/2001	251.9	1.105	362,740	400,828.1						
12/28/2001	239.5	1.103	344,936	380,463.9						
12/29/2001	229.5	1.114	330,448	368,118.8						
12/30/2001	182.3	1.115	262,531	292,721.9						
12/31/2001	281.3	1.095	405,011	443,486.8	11,532,634	12,727,581	1.104	33,289,656	36,669,375	1.102
1/1/2002	297.7	1.098	428,639	470,645.4						
1/2/2002	289.1	1.105	416,264	459,971.5						
1/3/2002	237.4	1.102	341,899	376,772.4						
1/4/2002	239.0	1.121	344,148	385,789.5						
1/5/2002	234.0	1.105	336,924	372,300.9						
1/6/2002	279.5	1.107	402,523	445,593.0						
1/7/2002	220.7	1.125	317,866	357,598.8						
1/8/2002	251.9	1.120	362,774	406,307.2						
1/9/2002	197.7	1.102	284,625	313,656.6						
1/10/2002	189.5	1.099	272,837	299,847.5						
1/11/2002	234.4	1.108	337,544	373,998.9						
1/12/2002	300.1	1.111	432,148	480,116.9						
1/13/2002	303.0	1.102	436,311	480,814.6						
1/14/2002	303.0	1.100	436,313	479,944.7						
1/15/2002	293.4	1.102	422,559	465,659.9						
1/16/2002	288.9	1.100	416,036	457,640.0						
1/17/2002	289.9	1.100	417,416	459,157.4						
1/18/2002	256.2	1.117	368,947	412,113.5						
1/19/2002	274.0	1.126	394,622	444,344.3						
1/20/2002	280.3	1.130	403,690	456,169.6						
1/21/2002	289.7	1.116	417,128	465,514.7						
1/22/2002	271.2	1.118	390,472	436,547.8						
1/23/2002	264.1	1.129	380,325	429,387.2						
1/24/2002	240.9	1.123	346,825	389,484.2						
1/25/2002	280.3	1.121	403,690	452,536.3						
1/26/2002	283.8	1.117	408,691	456,507.7						
1/27/2002	250.7	1.116	361,036	403,025.5						
1/28/2002	281.2	1.108	404,858	448,582.7						
1/29/2002	199.3	1.114	287,000	319,717.8						
1/30/2002	180.0	1.099	259,241	284,905.3						
1/31/2002	254.9	1.112	367,068	408,179.9	11,600,417	12,892,831	1.111	34,296,060	37,911,772	1.105

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2002	279.9	1.104	403,063	444,981.7						
2/2/2002	251.6	1.117	362,334	404,727.6						
2/3/2002	209.3	1.123	301,445	338,522.3						
2/4/2002	208.7	1.121	300,540	336,905.3						
2/5/2002	196.7	1.109	283,297	314,176.4						
2/6/2002	179.6	1.118	258,607	289,122.5						
2/7/2002	111.3	1.094	160,298	175,365.7						
2/8/2002	0.0	0.000	0	0.0						
2/9/2002	62.3	1.094	89,745	98,181.1						
2/10/2002	265.7	1.096	382,566	419,292.3						
2/11/2002	279.5	1.114	402,411	448,285.9						
2/12/2002	245.2	1.118	353,035	394,693.3						
2/13/2002	145.3	1.120	209,271	234,383.2						
2/14/2002	123.0	1.104	177,159	195,537.4						
2/15/2002	232.6	1.099	334,963	368,124.7						
2/16/2002	214.5	1.121	308,918	346,297.3						
2/17/2002	157.7	1.123	227,089	255,021.0						
2/18/2002	63.0	1.100	90,755	99,831.0						
2/19/2002	208.7	1.097	300,462	329,606.3						
2/20/2002	240.3	1.098	346,088	380,005.1						
2/21/2002	236.4	1.116	340,347	379,827.5						
2/22/2002	291.4	1.109	419,610	465,347.2						
2/23/2002	273.3	1.094	393,576	430,571.8						
2/24/2002	284.8	1.098	410,169	450,365.4						
2/25/2002	287.4	1.105	413,908	457,368.5						
2/26/2002	293.4	1.097	422,544	463,531.3						
2/27/2002	281.9	1.194	405,969	484,727.1						
2/28/2002	285.4	1.100	411,020	452,122.3	8,509,190	9,456,921	1.111	31,642,240	35,077,334	1.109
3/1/2002	253.1	1.124	364,528	409,729.7						
3/2/2002	293.5	1.100	422,647	464,912.2						
3/3/2002	180.1	1.110	259,346	287,874.1						
3/4/2002	0.0	0.000	0	0.0						
3/5/2002	0.0	0.000	0	0.0						
3/6/2002	0.0	0.000	0	0.0						
3/7/2002	0.0	0.000	0	0.0						
3/8/2002	0.0	0.000	0	0.0						
3/9/2002	0.0	0.000	0	0.0						
3/10/2002	265.6	1.135	382,514	434,153.1						
3/11/2002	286.2	1.119	412,101	461,141.4						
3/12/2002	284.3	1.109	409,340	453,957.7						
3/13/2002	283.6	1.109	408,392	452,906.9						
3/14/2002	275.7	1.111	396,976	441,040.5						
3/15/2002	268.1	1.106	386,023	426,941.6						
3/16/2002	278.2	1.108	400,636	443,904.7						
3/17/2002	280.0	1.103	403,258	444,793.2						
3/18/2002	244.8	1.120	352,523	394,825.4						
3/19/2002	250.8	1.106	361,101	399,377.7						
3/20/2002	269.2	1.123	387,686	435,370.9						
3/21/2002	253.2	1.120	364,577	408,326.1						
3/22/2002	79.3	1.110	114,204	126,767.0						
3/23/2002	184.8	1.096	266,175	291,727.4						
3/24/2002	185.0	1.096	266,399	291,972.8						
3/25/2002	161.6	1.101	232,651	256,149.2						
3/26/2002	177.7	1.096	255,876	280,439.7						
3/27/2002	182.1	1.095	262,259	287,174.1						
3/28/2002	237.0	1.104	341,320	376,817.0						
3/29/2002	215.1	1.095	309,758	339,184.6						
3/30/2002	253.0	1.108	364,299	403,643.8						
3/31/2002	247.4	1.105	356,269	393,676.8	8,480,857	9,406,808	1.109	28,590,464	31,756,560	1.111

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2002	185.3	1.097	266,840	292,844.0						
4/2/2002	226.4	1.091	325,977	355,551.5						
4/3/2002	192.8	1.093	277,682	303,447.2						
4/4/2002	23.2	1.099	33,453	36,764.1						
4/5/2002	74.7	1.095	107,621	117,805.1						
4/6/2002	241.5	1.094	347,689	380,508.6						
4/7/2002	227.1	1.099	327,091	359,584.5						
4/8/2002	250.4	1.100	360,506	396,622.7						
4/9/2002	288.2	1.096	414,986	455,030.0						
4/10/2002	286.0	1.094	411,797	450,483.9						
4/11/2002	289.9	1.088	417,469	454,237.7						
4/12/2002	291.0	1.096	418,984	459,261.5						
4/13/2002	286.0	1.091	411,790	449,379.6						
4/14/2002	289.7	1.088	417,139	453,791.0						
4/15/2002	294.5	1.090	424,097	462,264.1						
4/16/2002	272.6	1.092	392,485	428,748.4						
4/17/2002	192.6	1.100	277,409	305,140.3						
4/18/2002	168.5	1.094	242,626	265,375.3						
4/19/2002	212.6	1.101	306,204	337,273.4						
4/20/2002	283.5	1.096	408,304	447,511.9						
4/21/2002	251.8	1.097	362,589	397,752.7						
4/22/2002	162.5	1.102	234,030	257,792.6						
4/23/2002	171.5	1.113	246,958	274,909.7						
4/24/2002	214.9	1.112	309,431	344,001.5						
4/25/2002	192.1	1.109	276,671	306,789.5						
4/26/2002	250.9	1.112	361,300	401,846.9						
4/27/2002	242.3	1.117	348,952	389,683.2						
4/28/2002	195.0	1.142	280,753	320,529.9						
4/29/2002	210.7	1.131	303,451	343,284.0						
4/30/2002	225.0	1.114	324,014	360,950.9	9,638,297	10,609,166	1.101	26,628,344	29,472,895	1.107
5/1/2002	207.2	1.127	298,354	336,245.4						
5/2/2002	186.9	1.129	269,135	303,853.3						
5/3/2002	145.7	1.093	209,876	229,394.6						
5/4/2002	145.1	1.109	208,912	231,683.5						
5/5/2002	47.0	1.120	67,650	75,768.4						
5/6/2002	119.5	1.110	172,068	190,995.4						
5/7/2002	285.3	1.119	410,761	459,641.1						
5/8/2002	270.6	1.125	389,701	438,413.5						
5/9/2002	219.5	1.129	316,099	356,876.0						
5/10/2002	220.0	1.118	316,837	354,224.0						
5/11/2002	209.1	1.113	301,093	335,116.7						
5/12/2002	187.4	1.134	269,858	306,018.5						
5/13/2002	222.7	1.145	320,647	367,140.3						
5/14/2002	249.2	1.130	358,862	405,514.0						
5/15/2002	134.5	1.117	193,729	216,394.9						
5/16/2002	208.1	1.117	299,715	334,781.9						
5/17/2002	162.9	1.115	234,549	261,522.2						
5/18/2002	291.6	1.090	419,832	457,617.0						
5/19/2002	270.5	1.104	389,592	430,120.6						
5/20/2002	261.8	1.087	376,987	409,784.5						
5/21/2002	174.5	1.103	251,300	277,184.1						
5/22/2002	201.4	1.113	290,050	322,825.3						
5/23/2002	211.6	1.112	304,664	338,786.1						
5/24/2002	225.8	1.112	325,174	361,593.6						
5/25/2002	279.9	1.110	403,059	447,395.9						
5/26/2002	284.0	1.106	408,889	452,231.0						
5/27/2002	274.7	1.109	395,542	438,655.5						
5/28/2002	258.8	1.098	372,628	409,145.8						
5/29/2002	280.2	1.102	403,500	444,656.7						
5/30/2002	280.5	1.098	403,896	443,477.6						
5/31/2002	280.0	1.093	403,267	440,771.0	9,786,225	10,877,829	1.112	27,905,379	30,893,802	1.107

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2002	270.1	1.091	388,894	424,283.1						
6/2/2002	266.7	1.093	384,064	419,782.1						
6/3/2002	255.4	1.104	367,804	406,055.4						
6/4/2002	243.7	1.109	350,866	389,110.5						
6/5/2002	265.4	1.110	382,183	424,222.6						
6/6/2002	276.8	1.114	398,629	444,072.2						
6/7/2002	267.6	1.088	385,351	419,261.7						
6/8/2002	247.8	1.115	356,844	397,880.6						
6/9/2002	255.6	1.108	368,049	407,798.1						
6/10/2002	275.7	1.093	397,030	433,953.5						
6/11/2002	284.1	1.096	409,129	448,405.1						
6/12/2002	183.2	1.106	263,777	291,737.9						
6/13/2002	149.2	1.095	214,828	235,236.6						
6/14/2002	241.8	1.125	348,230	391,758.2						
6/15/2002	214.4	1.122	308,709	346,371.0						
6/16/2002	218.7	1.120	314,951	352,745.6						
6/17/2002	269.5	1.099	388,080	426,500.2						
6/18/2002	234.9	1.109	338,200	375,063.9						
6/19/2002	191.1	1.129	275,146	310,640.3						
6/20/2002	236.6	1.096	340,715	373,423.6						
6/21/2002	220.4	1.115	317,310	353,800.5						
6/22/2002	194.4	1.106	279,964	309,640.2						
6/23/2002	198.2	1.106	285,392	315,643.1						
6/24/2002	148.2	1.118	213,420	238,604.1						
6/25/2002	213.6	1.087	307,606	334,367.4						
6/26/2002	255.1	1.109	367,307	407,343.5						
6/27/2002	272.6	1.115	392,607	437,756.3						
6/28/2002	285.5	1.119	411,113	460,035.2						
6/29/2002	283.9	1.099	408,819	449,292.6						
6/30/2002	290.0	1.108	417,634	462,738.4	10,382,649	11,487,524	1.106	29,807,170	32,974,518	1.106
7/1/2002	290.0	1.094	417,596	456,850.0						
7/2/2002	281.8	1.097	405,797	445,159.2						
7/3/2002	237.0	1.107	341,294	377,812.6						
7/4/2002	186.5	1.105	268,617	296,822.0						
7/5/2002	209.5	1.111	301,703	335,191.5						
7/6/2002	188.7	1.129	271,698	306,747.2						
7/7/2002	201.8	1.131	290,602	328,671.2						
7/8/2002	203.1	1.127	292,478	329,622.6						
7/9/2002	204.3	1.124	294,192	330,671.5						
7/10/2002	246.7	1.128	355,202	400,667.4						
7/11/2002	193.9	1.127	279,181	314,637.1						
7/12/2002	200.2	1.123	288,329	323,793.5						
7/13/2002	233.2	1.127	335,763	378,404.9						
7/14/2002	266.0	1.114	382,982	426,641.4						
7/15/2002	271.4	1.104	390,760	431,398.6						
7/16/2002	287.8	1.090	414,373	451,667.0						
7/17/2002	291.6	1.103	419,944	463,198.0						
7/18/2002	280.9	1.097	404,529	443,768.7						
7/19/2002	0.0	0.000	0	0.0						
7/20/2002	0.0	0.000	0	0.0						
7/21/2002	0.0	0.000	0	0.0						
7/22/2002	0.0	0.000	0	0.0						
7/23/2002	0.0	1.124	0	0.0						
7/24/2002	272.2	1.111	391,918	435,420.7						
7/25/2002	263.3	1.094	379,155	414,796.0						
7/26/2002	248.7	1.100	358,197	394,017.2						
7/27/2002	253.0	1.114	364,367	405,904.6						
7/28/2002	249.9	1.110	359,867	399,452.9						
7/29/2002	243.8	1.100	351,017	386,119.1						
7/30/2002	259.4	1.107	373,525	413,492.2						
7/31/2002	0.0	0.000	0	0.0	8,733,087	9,690,927	1.110	28,901,960	32,056,279	1.109

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2002	237.1	1.125	341,406	384,097.7						
8/2/2002	189.2	1.124	272,379	306,137.7						
8/3/2002	170.4	1.101	245,391	270,071.5						
8/4/2002	183.7	1.112	264,491	294,195.9						
8/5/2002	178.4	1.119	256,865	287,511.8						
8/6/2002	158.9	1.134	228,780	259,425.5						
8/7/2002	261.6	1.113	376,735	419,363.3						
8/8/2002	252.0	1.115	362,855	404,676.9						
8/9/2002	266.7	1.102	384,086	423,222.1						
8/10/2002	181.1	1.102	260,780	287,323.0						
8/11/2002	96.0	1.113	138,195	153,846.7						
8/12/2002	245.5	1.107	353,566	391,450.9						
8/13/2002	269.5	1.103	388,022	427,908.7						
8/14/2002	223.7	1.091	322,081	351,405.2						
8/15/2002	257.2	1.101	370,339	407,841.4						
8/16/2002	282.1	1.101	406,164	447,149.2						
8/17/2002	286.7	1.103	412,821	455,235.1						
8/18/2002	302.7	1.095	435,850	477,189.5						
8/19/2002	302.6	1.108	435,793	482,656.9						
8/20/2002	288.0	1.107	414,688	459,084.7						
8/21/2002	291.0	1.106	419,074	463,521.2						
8/22/2002	254.3	1.108	366,233	405,830.5						
8/23/2002	285.9	1.098	411,755	452,065.8						
8/24/2002	284.4	1.105	409,607	452,574.6						
8/25/2002	285.3	1.112	410,833	456,806.0						
8/26/2002	230.3	1.096	331,661	363,573.5						
8/27/2002	286.7	1.097	412,819	452,953.2						
8/28/2002	290.7	1.096	418,557	458,697.0						
8/29/2002	282.3	1.110	406,446	451,179.1						
8/30/2002	231.4	1.110	333,263	369,942.3						
8/31/2002	216.3	1.104	311,484	343,834.9	10,903,019	12,060,772	1.106	30,018,754	33,239,222	1.107
9/1/2002	227.0	1.109	326,846	362,440.3						
9/2/2002	222.1	1.114	319,882	356,418.2						
9/3/2002	121.1	1.116	174,360	194,524.7						
9/4/2002	235.3	1.098	338,889	372,156.7						
9/5/2002	229.6	1.100	330,591	363,582.5						
9/6/2002	161.0	1.102	231,876	255,604.2						
9/7/2002	224.5	1.111	323,233	359,097.1						
9/8/2002	275.9	1.089	397,237	432,509.2						
9/9/2002	289.2	1.097	416,392	456,740.9						
9/10/2002	284.2	1.093	409,274	447,361.0						
9/11/2002	285.6	1.091	411,225	448,628.1						
9/12/2002	283.9	1.095	408,873	447,857.0						
9/13/2002	279.5	1.103	402,427	443,800.3						
9/14/2002	261.2	1.099	376,135	413,203.9						
9/15/2002	202.4	1.099	291,483	320,421.1						
9/16/2002	169.1	1.109	243,497	270,027.3						
9/17/2002	187.9	1.103	270,578	298,435.2						
9/18/2002	230.3	1.097	331,582	363,732.5						
9/19/2002	162.8	1.108	234,440	259,724.0						
9/20/2002	272.4	1.100	392,239	431,569.6						
9/21/2002	267.3	1.099	384,922	423,049.8						
9/22/2002	281.5	1.092	405,307	442,468.7						
9/23/2002	237.8	1.105	342,361	378,472.6						
9/24/2002	251.5	1.103	362,145	399,560.6						
9/25/2002	180.1	1.097	259,319	284,407.8						
9/26/2002	282.8	1.090	407,217	444,029.3						
9/27/2002	284.7	1.117	410,031	458,113.1						
9/28/2002	282.9	1.116	407,327	454,493.3						
9/29/2002	231.9	1.117	333,946	373,037.4						
9/30/2002	245.9	1.119	354,137	396,300.3	10,297,771	11,351,767	1.102	29,933,876	33,103,466	1.106

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2002	245.9	1.120	354,039	396,379.1						
10/2/2002	267.3	1.119	384,983	430,840.0						
10/3/2002	239.1	1.115	344,304	383,812.2						
10/4/2002	202.6	1.101	291,746	321,264.5						
10/5/2002	221.7	1.106	319,277	352,992.2						
10/6/2002	196.0	1.108	282,232	312,599.8						
10/7/2002	190.7	1.110	274,538	304,664.0						
10/8/2002	195.3	1.120	281,215	314,886.1						
10/9/2002	266.6	1.108	383,920	425,424.4						
10/10/2002	258.0	1.097	371,475	407,603.8						
10/11/2002	168.8	1.112	243,012	270,328.5						
10/12/2002	258.6	1.121	372,408	417,621.6						
10/13/2002	284.8	1.118	410,142	458,707.3						
10/14/2002	264.8	1.118	381,347	426,502.1						
10/15/2002	254.5	1.113	366,453	407,745.5						
10/16/2002	257.2	1.122	370,383	415,547.2						
10/17/2002	261.2	1.114	376,068	418,982.7						
10/18/2002	203.5	1.113	293,009	326,014.5						
10/19/2002	212.3	1.111	305,641	339,605.5						
10/20/2002	222.2	1.099	319,952	351,511.3						
10/21/2002	170.9	1.113	246,086	273,804.7						
10/22/2002	0.0	0.000	0	0.0						
10/23/2002	0.0	0.000	0	0.0						
10/24/2002	0.0	0.000	0	0.0						
10/25/2002	0.0	0.000	0	0.0						
10/26/2002	0.0	0.000	0	0.0						
10/27/2002	0.0	0.000	0	0.0						
10/28/2002	0.0	0.000	0	0.0						
10/29/2002	0.0	0.000	0	0.0						
10/30/2002	0.0	0.000	0	0.0						
10/31/2002	0.0	0.000	0	0.0	6,972,231	7,756,837	1.113	28,173,021	31,169,375	1.106
11/1/2002	0.0	0.000	0	0.0						
11/2/2002	244.3	1.108	351,758	389,699.2						
11/3/2002	236.8	1.097	340,977	374,005.0						
11/4/2002	110.6	1.079	159,193	171,747.7						
11/5/2002	118.8	1.074	171,012	183,642.9						
11/6/2002	265.7	1.084	382,540	414,620.6						
11/7/2002	244.8	1.081	352,561	381,053.1						
11/8/2002	272.2	1.101	391,915	431,426.7						
11/9/2002	280.1	1.084	403,297	437,310.5						
11/10/2002	285.0	1.086	410,419	445,813.8						
11/11/2002	272.5	1.089	392,345	427,147.4						
11/12/2002	223.2	1.108	321,375	356,022.6						
11/13/2002	200.5	1.115	288,778	322,112.1						
11/14/2002	0.0	0.000	0	0.0						
11/15/2002	29.5	1.083	42,499	46,041.9						
11/16/2002	103.8	1.094	149,425	163,417.4						
11/17/2002	145.9	1.088	210,048	228,511.0						
11/18/2002	137.1	1.088	197,488	214,868.6						
11/19/2002	169.8	1.097	244,557	268,281.1						
11/20/2002	255.8	1.114	368,325	410,336.0						
11/21/2002	248.7	1.117	358,059	399,930.1						
11/22/2002	255.8	1.094	368,347	402,949.3						
11/23/2002	255.0	1.104	367,141	405,341.1						
11/24/2002	235.0	1.107	338,412	374,458.4						
11/25/2002	251.4	1.109	362,043	401,330.3						
11/26/2002	268.1	1.089	386,086	420,260.5						
11/27/2002	295.4	1.101	425,446	468,210.2						
11/28/2002	297.9	1.105	429,038	473,879.8						
11/29/2002	269.9	1.114	388,591	432,702.5						
11/30/2002	262.3	1.112	377,724	420,069.0	8,979,400	9,865,188	1.099	26,249,401	28,973,792	1.104

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2002	286.3	1.115	412,325	459,830.2						
12/2/2002	268.1	1.114	385,995	430,080.7						
12/3/2002	266.9	1.099	384,377	422,613.5						
12/4/2002	259.8	1.103	374,159	412,561.4						
12/5/2002	204.8	1.085	294,956	319,915.6						
12/6/2002	201.2	1.070	289,728	309,899.6						
12/7/2002	233.3	1.091	335,942	366,385.7						
12/8/2002	286.8	1.082	412,957	446,989.3						
12/9/2002	290.8	1.087	418,715	455,315.1						
12/10/2002	279.6	1.086	402,588	437,058.3						
12/11/2002	283.1	1.101	407,662	448,768.4						
12/12/2002	294.2	1.112	423,685	471,022.8						
12/13/2002	292.7	1.112	421,505	468,598.7						
12/14/2002	274.6	1.111	395,445	439,250.3						
12/15/2002	193.9	1.116	279,179	311,561.7						
12/16/2002	293.4	1.091	422,437	460,814.4						
12/17/2002	129.4	1.101	186,350	205,261.6						
12/18/2002	258.0	1.098	371,585	408,141.0						
12/19/2002	250.8	1.090	361,136	393,734.2						
12/20/2002	268.8	1.098	387,134	425,176.2						
12/21/2002	286.7	1.120	412,859	462,273.7						
12/22/2002	286.4	1.123	412,395	462,994.5						
12/23/2002	286.4	1.109	412,393	457,420.6						
12/24/2002	131.0	1.106	188,601	208,630.0						
12/25/2002	290.4	1.102	418,128	460,574.9						
12/26/2002	287.6	1.095	414,143	453,656.2						
12/27/2002	239.5	1.108	344,844	382,248.8						
12/28/2002	254.7	1.114	366,742	408,533.9						
12/29/2002	275.7	1.108	397,004	439,862.0						
12/30/2002	260.7	1.113	375,445	417,823.7						
12/31/2002	289.1	1.120	416,338	466,392.5	11,526,754	12,713,389	1.103	27,478,384	30,335,415	1.104
1/1/2003	286.3	1.090	412,301	449,408.5						
1/2/2003	261.8	1.091	377,045	411,218.3						
1/3/2003	246.3	1.121	354,695	397,653.1						
1/4/2003	206.3	1.101	297,131	327,154.0						
1/5/2003	228.2	1.111	328,592	365,205.2						
1/6/2003	260.6	1.116	375,307	418,825.6						
1/7/2003	186.8	1.121	269,049	301,522.4						
1/8/2003	196.8	1.133	283,368	320,952.9						
1/9/2003	216.1	1.109	311,251	345,328.2						
1/10/2003	231.5	1.086	333,354	362,112.6						
1/11/2003	193.5	1.119	278,672	311,964.4						
1/12/2003	213.0	1.119	306,783	343,413.6						
1/13/2003	258.4	1.086	372,159	404,305.5						
1/14/2003	269.7	1.092	388,333	423,941.8						
1/15/2003	250.2	1.113	360,235	400,848.2						
1/16/2003	216.1	1.113	311,242	346,529.7						
1/17/2003	203.7	1.107	293,298	324,681.2						
1/18/2003	218.7	1.099	314,999	346,169.4						
1/19/2003	249.0	1.102	358,519	395,071.3						
1/20/2003	265.0	1.105	381,634	421,710.9						
1/21/2003	242.5	1.127	349,138	393,557.5						
1/22/2003	164.4	1.104	236,706	261,438.2						
1/23/2003	0.0	0.000	0	0.0						
1/24/2003	0.0	0.000	0	0.0						
1/25/2003	237.1	1.110	341,401	378,797.4						
1/26/2003	207.3	1.129	298,482	336,864.2						
1/27/2003	269.9	1.104	388,619	429,061.6						
1/28/2003	270.0	1.107	388,821	430,533.1						
1/29/2003	246.6	1.122	355,043	398,247.9						
1/30/2003	213.8	1.096	307,892	337,495.9						
1/31/2003	200.8	1.114	289,102	321,998.5	9,663,171	10,706,011	1.108	30,169,325	33,284,589	1.103

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2003	257.1	1.121	370,164	414,796.4						
2/2/2003	282.4	1.107	406,688	450,116.9						
2/3/2003	282.4	1.112	406,651	452,287.4						
2/4/2003	232.7	1.105	335,036	370,265.3						
2/5/2003	256.1	1.104	368,717	407,200.0						
2/6/2003	251.0	1.115	361,443	403,140.3						
2/7/2003	207.7	1.110	299,147	332,026.1						
2/8/2003	182.6	1.117	262,915	293,580.5						
2/9/2003	202.2	1.126	291,122	327,913.4						
2/10/2003	288.9	1.116	415,968	464,335.8						
2/11/2003	295.0	1.114	424,785	473,284.4						
2/12/2003	295.0	1.108	424,752	470,676.5						
2/13/2003	286.5	1.105	412,624	456,148.7						
2/14/2003	270.4	1.112	389,443	433,166.9						
2/15/2003	273.3	1.112	393,532	437,714.2						
2/16/2003	254.4	1.104	366,335	404,284.2						
2/17/2003	251.4	1.105	362,012	399,874.8						
2/18/2003	256.2	1.114	368,877	410,800.2						
2/19/2003	274.8	1.124	395,704	444,965.6						
2/20/2003	286.7	1.116	412,828	460,909.6						
2/21/2003	281.8	1.112	405,789	451,113.5						
2/22/2003	278.3	1.114	400,711	446,222.4						
2/23/2003	224.8	1.114	323,770	360,728.6						
2/24/2003	281.4	1.109	405,155	449,483.2						
2/25/2003	291.7	1.102	420,057	462,705.5						
2/26/2003	227.2	1.105	327,159	361,510.5						
2/27/2003	109.8	1.103	158,128	174,391.6						
2/28/2003	243.1	1.105	350,066	386,971.3	10,259,576	11,400,614	1.111	31,449,501	34,820,014	1.107
3/1/2003	271.3	1.118	390,711	436,938.9						
3/2/2003	264.0	1.108	380,178	421,357.8						
3/3/2003	205.2	1.125	295,507	332,573.1						
3/4/2003	188.5	1.126	271,510	305,691.3						
3/5/2003	208.1	1.132	299,617	339,154.8						
3/6/2003	243.2	1.142	350,155	399,972.4						
3/7/2003	207.6	1.130	298,889	337,843.5						
3/8/2003	223.4	1.129	321,693	363,334.9						
3/9/2003	221.6	1.136	319,144	362,655.6						
3/10/2003	101.1	1.141	145,624	166,174.1						
3/11/2003	0.0	0.000	0	0.0						
3/12/2003	0.0	0.000	0	0.0						
3/13/2003	233.4	1.131	336,154	380,299.7						
3/14/2003	273.6	1.116	394,039	439,914.7						
3/15/2003	278.3	1.113	400,704	446,153.4						
3/16/2003	238.1	1.122	342,880	384,747.2						
3/17/2003	240.3	1.124	346,038	389,001.4						
3/18/2003	232.3	1.128	334,482	377,145.9						
3/19/2003	188.2	1.116	271,006	302,486.2						
3/20/2003	186.6	1.113	268,728	299,210.6						
3/21/2003	235.1	1.107	338,608	374,965.1						
3/22/2003	235.6	1.122	339,263	380,511.1						
3/23/2003	242.5	1.132	349,147	395,197.7						
3/24/2003	262.9	1.127	378,570	426,751.9						
3/25/2003	285.6	1.120	411,263	460,748.6						
3/26/2003	0.0	0.000	0	0.0						
3/27/2003	207.4	1.017	298,693	303,709.1						
3/28/2003	130.2	1.096	187,484	205,435.1						
3/29/2003	70.8	1.115	101,919	113,687.6						
3/30/2003	90.5	1.124	130,330	146,552.0						
3/31/2003	234.3	1.112	337,421	375,230.4	8,639,758	9,667,444	1.119	28,562,505	31,774,069	1.112

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2003	239.9	1.107	345,506	382,622.1						
4/2/2003	264.8	1.104	381,357	421,000.6						
4/3/2003	261.0	1.114	375,862	418,575.7						
4/4/2003	229.2	1.121	329,995	369,918.7						
4/5/2003	220.0	1.110	316,755	351,715.8						
4/6/2003	178.3	1.095	256,789	281,280.9						
4/7/2003	160.4	1.101	231,046	254,395.1						
4/8/2003	286.8	1.106	412,960	456,911.8						
4/9/2003	214.3	1.107	308,596	341,536.2						
4/10/2003	227.2	1.122	327,230	367,015.8						
4/11/2003	228.7	1.122	329,280	369,606.9						
4/12/2003	94.4	1.100	135,926	149,574.7						
4/13/2003	213.1	1.100	306,844	337,543.0						
4/14/2003	260.9	1.096	375,723	411,855.2						
4/15/2003	254.8	1.106	366,859	405,918.2						
4/16/2003	233.1	1.110	335,725	372,618.9						
4/17/2003	219.6	1.110	316,257	351,162.4						
4/18/2003	209.1	1.116	301,152	336,090.3						
4/19/2003	188.1	1.135	270,919	307,437.6						
4/20/2003	224.1	1.135	322,669	366,195.1						
4/21/2003	258.7	1.130	372,473	420,939.0						
4/22/2003	243.5	1.105	350,697	387,355.8						
4/23/2003	266.9	1.126	384,381	432,774.9						
4/24/2003	182.6	1.106	262,927	290,894.4						
4/25/2003	284.3	1.126	409,371	460,868.0						
4/26/2003	242.1	1.119	348,646	389,971.2						
4/27/2003	248.5	1.125	357,777	402,553.1						
4/28/2003	237.7	1.130	342,322	386,823.4						
4/29/2003	238.9	1.108	343,988	381,156.4						
4/30/2003	239.4	1.106	344,697	381,344.0	9,864,729	10,987,655	1.114	28,764,062	32,055,713	1.114
5/1/2003	161.3	1.114	232,339	258,716.7						
5/2/2003	158.8	1.093	228,679	249,862.4						
5/3/2003	199.0	1.095	286,509	313,836.0						
5/4/2003	179.7	1.097	258,775	283,894.9						
5/5/2003	198.8	1.102	286,221	315,432.3						
5/6/2003	253.4	1.127	364,900	411,421.5						
5/7/2003	224.7	1.148	323,504	371,538.8						
5/8/2003	170.1	1.120	244,968	274,254.6						
5/9/2003	151.9	1.100	218,709	240,583.9						
5/10/2003	190.6	1.119	274,451	307,014.4						
5/11/2003	213.5	1.124	307,419	345,620.7						
5/12/2003	213.0	1.128	306,752	346,160.3						
5/13/2003	208.1	1.130	299,681	338,735.1						
5/14/2003	194.9	1.136	280,604	318,900.2						
5/15/2003	191.6	1.123	275,969	309,783.3						
5/16/2003	178.5	1.121	257,104	288,336.7						
5/17/2003	235.3	1.118	338,843	378,918.9						
5/18/2003	278.7	1.101	401,361	441,919.2						
5/19/2003	280.7	1.112	404,204	449,630.1						
5/20/2003	257.4	1.123	370,591	416,355.3						
5/21/2003	254.0	1.129	365,690	412,980.8						
5/22/2003	236.8	1.125	340,923	383,699.0						
5/23/2003	172.0	1.117	247,665	276,758.7						
5/24/2003	221.2	1.108	318,587	352,926.4						
5/25/2003	235.6	1.133	339,263	384,544.7						
5/26/2003	243.4	1.143	350,524	400,651.4						
5/27/2003	229.7	1.143	330,718	378,012.9						
5/28/2003	219.8	1.141	316,511	361,007.2						
5/29/2003	168.0	1.119	241,913	270,815.6						
5/30/2003	180.9	1.125	260,539	293,230.1						
5/31/2003	193.6	1.128	278,741	314,538.5	9,352,656	10,490,081	1.122	27,857,143	31,145,180	1.118

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2003	200.1	1.107	288,103	319,010.7						
6/2/2003	203.9	1.108	293,669	325,371.6						
6/3/2003	199.4	1.105	287,201	317,387.2						
6/4/2003	187.4	1.101	269,843	297,126.0						
6/5/2003	247.7	1.104	356,632	393,610.8						
6/6/2003	258.2	1.100	371,812	408,993.3						
6/7/2003	263.9	1.103	379,981	418,998.0						
6/8/2003	260.0	1.110	374,375	415,596.1						
6/9/2003	259.1	1.115	373,104	415,954.3						
6/10/2003	161.5	1.108	232,619	257,857.7						
6/11/2003	162.8	1.110	234,448	260,276.0						
6/12/2003	235.1	1.111	338,594	376,330.7						
6/13/2003	230.2	1.098	331,554	363,981.2						
6/14/2003	236.0	1.110	339,815	377,176.2						
6/15/2003	263.8	1.104	379,865	419,350.5						
6/16/2003	244.6	1.109	352,288	390,708.4						
6/17/2003	261.7	1.110	376,808	418,359.6						
6/18/2003	85.2	1.121	122,693	137,579.0						
6/19/2003	287.1	1.133	413,373	468,244.7						
6/20/2003	283.6	1.105	408,351	451,209.2						
6/21/2003	284.2	1.118	409,280	457,773.5						
6/22/2003	285.0	1.104	410,440	453,258.8						
6/23/2003	229.3	1.100	330,148	363,045.2						
6/24/2003	178.8	1.142	257,477	294,147.7						
6/25/2003	179.3	1.152	258,200	297,420.9						
6/26/2003	143.0	1.120	205,935	230,691.2						
6/27/2003	229.0	1.093	329,741	360,267.2						
6/28/2003	227.3	1.102	327,336	360,620.7						
6/29/2003	218.4	1.110	314,564	349,066.0						
6/30/2003	248.0	1.102	357,190	393,548.0	9,725,440	10,792,960	1.110	28,942,825	32,270,696	1.115
7/1/2003	252.6	1.113	363,806	404,782.0						
7/2/2003	205.7	1.118	296,264	331,209.4						
7/3/2003	188.4	1.102	271,362	298,942.2						
7/4/2003	196.9	1.108	283,546	314,219.5						
7/5/2003	223.2	1.128	321,433	362,425.5						
7/6/2003	241.9	1.123	348,317	391,143.5						
7/7/2003	266.2	1.120	383,357	429,502.2						
7/8/2003	249.5	1.116	359,278	400,953.9						
7/9/2003	191.3	1.112	275,488	306,227.4						
7/10/2003	221.4	1.114	318,761	354,983.9						
7/11/2003	252.4	1.092	363,440	396,876.1						
7/12/2003	196.5	1.092	282,982	309,016.2						
7/13/2003	0.0	0.000	0	0.0						
7/14/2003	222.4	1.106	320,190	354,198.3						
7/15/2003	240.3	1.112	346,063	384,895.9						
7/16/2003	238.1	1.095	342,905	375,467.5						
7/17/2003	246.2	1.104	354,522	391,488.5						
7/18/2003	253.7	1.101	365,345	402,343.9						
7/19/2003	158.8	1.103	228,725	252,344.8						
7/20/2003	152.0	1.108	218,916	242,547.6						
7/21/2003	185.1	1.103	266,525	293,851.8						
7/22/2003	182.7	1.114	263,078	293,043.4						
7/23/2003	194.3	1.115	279,792	312,103.3						
7/24/2003	236.2	1.113	340,159	378,617.0						
7/25/2003	249.3	1.112	359,056	399,198.6						
7/26/2003	0.0	0.000	0	0.0						
7/27/2003	0.0	0.000	0	0.0						
7/28/2003	179.9	1.093	259,018	283,039.9						
7/29/2003	185.7	1.096	267,358	292,913.4						
7/30/2003	231.9	1.195	333,943	399,170.4						
7/31/2003	254.9	1.113	367,069	408,514.1	8,780,697	9,764,020	1.112	27,858,793	31,047,061	1.114

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2003	231.7	1.102	333,707	367,732.6						
8/2/2003	222.7	1.111	320,690	356,154.9						
8/3/2003	194.8	1.109	280,491	311,200.5						
8/4/2003	208.7	1.099	300,588	330,396.2						
8/5/2003	143.4	1.112	206,565	229,605.6						
8/6/2003	136.7	1.108	196,914	218,140.4						
8/7/2003	173.7	1.106	250,078	276,523.9						
8/8/2003	190.2	1.118	273,828	306,112.2						
8/9/2003	253.4	1.113	364,904	406,024.7						
8/10/2003	270.8	1.096	389,917	427,289.9						
8/11/2003	276.8	1.107	398,550	441,073.2						
8/12/2003	238.8	1.108	343,851	381,062.4						
8/13/2003	272.5	1.101	392,416	431,868.5						
8/14/2003	261.3	1.111	376,212	418,031.5						
8/15/2003	246.1	1.095	354,448	388,271.1						
8/16/2003	165.7	1.094	238,541	260,952.4						
8/17/2003	172.0	1.095	247,659	271,162.4						
8/18/2003	186.8	1.114	268,994	299,661.5						
8/19/2003	239.5	1.121	344,898	386,687.5						
8/20/2003	100.0	1.090	144,069	157,005.5						
8/21/2003	102.7	1.128	147,919	166,901.0						
8/22/2003	225.7	1.091	325,077	354,780.1						
8/23/2003	183.7	1.098	264,512	290,309.7						
8/24/2003	227.7	1.087	327,883	356,565.7						
8/25/2003	244.7	1.100	352,398	387,715.2						
8/26/2003	188.5	1.111	271,488	301,682.9						
8/27/2003	186.5	1.107	268,544	297,378.3						
8/28/2003	172.2	1.101	247,903	273,032.9						
8/29/2003	182.3	1.103	262,511	289,483.7						
8/30/2003	167.7	1.095	241,416	264,391.0						
8/31/2003	211.3	1.111	304,232	338,050.3	9,041,206	9,985,248	1.104	27,547,343	30,542,228	1.109
9/1/2003	243.2	1.090	350,221	381,870.9						
9/2/2003	285.5	1.104	411,164	453,756.2						
9/3/2003	257.7	1.106	371,031	410,363.0						
9/4/2003	254.2	1.095	366,032	400,940.3						
9/5/2003	261.3	1.096	376,263	412,207.4						
9/6/2003	242.3	1.093	348,933	381,346.7						
9/7/2003	202.8	1.090	292,040	318,324.0						
9/8/2003	61.8	1.087	88,953	96,669.9						
9/9/2003	173.2	1.093	249,393	272,667.9						
9/10/2003	202.3	1.092	291,277	317,970.6						
9/11/2003	247.7	1.090	356,658	388,589.7						
9/12/2003	269.9	1.087	388,644	422,582.8						
9/13/2003	267.9	1.092	385,771	421,448.4						
9/14/2003	271.8	1.103	391,427	431,707.8						
9/15/2003	247.5	1.096	356,370	390,454.1						
9/16/2003	247.0	1.106	355,695	393,533.0						
9/17/2003	155.9	1.095	224,453	245,864.2						
9/18/2003	260.0	1.093	374,376	409,317.5						
9/19/2003	254.8	1.100	366,864	403,630.5						
9/20/2003	287.7	1.095	414,332	453,652.4						
9/21/2003	281.0	1.098	404,634	444,293.4						
9/22/2003	254.0	1.091	365,695	399,077.4						
9/23/2003	240.1	1.119	345,693	386,835.4						
9/24/2003	230.2	1.108	331,556	367,473.7						
9/25/2003	242.5	1.106	349,226	386,320.4						
9/26/2003	241.4	1.100	347,678	382,282.3						
9/27/2003	219.8	1.091	316,583	345,327.2						
9/28/2003	158.0	1.097	227,462	249,465.7						
9/29/2003	157.2	1.181	226,303	267,191.2						
9/30/2003	221.4	1.112	318,818	354,593.5	9,993,545	10,989,758	1.100	27,815,447	30,739,026	1.105

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2003	221.1	1.108	318,361	352,798.7						
10/2/2003	214.3	1.106	308,624	341,424.6						
10/3/2003	256.6	1.098	369,437	405,685.9						
10/4/2003	275.0	1.098	395,995	434,640.3						
10/5/2003	247.6	1.098	356,522	391,390.1						
10/6/2003	220.4	1.092	317,309	346,590.3						
10/7/2003	194.9	1.097	280,610	307,875.9						
10/8/2003	185.0	1.089	266,425	290,255.7						
10/9/2003	210.3	1.101	302,848	333,533.7						
10/10/2003	174.6	1.080	251,394	271,587.6						
10/11/2003	145.8	1.117	209,990	234,638.3						
10/12/2003	154.0	1.117	221,752	247,757.7						
10/13/2003	169.9	1.105	244,702	270,474.9						
10/14/2003	191.6	1.106	275,845	305,128.2						
10/15/2003	200.0	1.120	288,066	322,680.2						
10/16/2003	196.1	1.106	282,322	312,190.2						
10/17/2003	180.4	1.101	259,736	286,040.4						
10/18/2003	168.7	1.116	242,904	271,145.0						
10/19/2003	162.1	1.128	233,404	263,219.9						
10/20/2003	169.6	1.105	244,264	269,861.9						
10/21/2003	177.7	1.093	255,884	279,805.1						
10/22/2003	13.4	1.099	19,277	21,176.2						
10/23/2003	86.6	1.099	124,767	137,120.2						
10/24/2003	186.1	1.096	268,055	293,776.4						
10/25/2003	214.8	1.106	309,351	342,159.0						
10/26/2003	250.0	1.088	359,989	391,687.4						
10/27/2003	237.9	1.109	342,544	379,829.3						
10/28/2003	236.4	1.104	340,467	375,839.7						
10/29/2003	231.5	1.117	333,295	372,134.3						
10/30/2003	243.8	1.105	351,072	387,772.6						
10/31/2003	0.0	0.000	0	0.0	8,375,215	9,240,220	1.103	27,409,965	30,215,225	1.102
11/1/2003	243.7	1.088	350,871	381,864.1						
11/2/2003	238.3	1.092	343,089	374,767.4						
11/3/2003	177.9	1.110	256,106	284,210.0						
11/4/2003	185.9	1.116	267,731	298,759.3						
11/5/2003	220.6	1.120	317,664	355,733.7						
11/6/2003	223.2	1.118	321,386	359,441.7						
11/7/2003	199.0	1.104	286,529	316,388.6						
11/8/2003	190.0	1.091	273,587	298,556.2						
11/9/2003	193.6	1.092	278,757	304,345.5						
11/10/2003	186.6	1.099	268,771	295,323.9						
11/11/2003	204.5	1.099	294,536	323,790.5						
11/12/2003	237.5	1.128	342,022	385,950.9						
11/13/2003	263.0	1.113	378,674	421,331.3						
11/14/2003	248.5	1.126	357,882	402,812.2						
11/15/2003	230.9	1.127	332,507	374,794.7						
11/16/2003	238.0	1.127	342,691	386,058.5						
11/17/2003	223.7	1.130	322,161	363,941.6						
11/18/2003	254.4	1.123	366,401	411,432.6						
11/19/2003	254.7	1.102	366,769	404,065.1						
11/20/2003	260.1	1.109	374,556	415,424.9						
11/21/2003	260.0	1.114	374,347	417,027.6						
11/22/2003	204.3	1.113	294,207	327,577.4						
11/23/2003	227.4	1.104	327,456	361,441.9						
11/24/2003	274.3	1.093	394,926	431,755.7						
11/25/2003	285.3	1.102	410,896	452,789.0						
11/26/2003	283.3	1.102	407,890	449,603.4						
11/27/2003	232.4	1.105	334,607	369,690.2						
11/28/2003	243.0	1.011	349,856	353,556.5						
11/29/2003	226.2	1.119	325,724	364,627.6						
11/30/2003	235.2	1.126	338,664	381,448.1	10,001,264	11,068,510	1.107	28,370,024	31,298,488	1.103

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2003	105.3	1.129	151,671	171,279.0						
12/2/2003	106.6	1.140	153,462	175,023.5						
12/3/2003	108.7	1.125	156,538	176,035.2						
12/4/2003	112.2	1.127	161,550	182,067.6						
12/5/2003	114.9	1.125	165,446	186,153.9						
12/6/2003	146.2	1.117	210,574	235,123.5						
12/7/2003	149.7	1.122	215,612	241,861.0						
12/8/2003	94.3	1.099	135,817	149,300.8						
12/9/2003	95.3	1.109	137,259	152,237.1						
12/10/2003	122.3	1.115	176,129	196,430.4						
12/11/2003	87.1	1.117	125,353	140,072.7						
12/12/2003	85.6	1.115	123,296	137,533.4						
12/13/2003	104.8	1.110	150,862	167,432.1						
12/14/2003	155.1	1.110	223,273	247,737.9						
12/15/2003	145.4	1.109	209,408	232,312.8						
12/16/2003	117.6	1.116	169,356	189,047.5						
12/17/2003	66.1	1.116	95,113	106,126.3						
12/18/2003	115.6	1.107	166,448	184,329.8						
12/19/2003	141.2	1.096	203,356	222,901.1						
12/20/2003	135.3	1.102	194,833	214,788.1						
12/21/2003	140.3	1.107	202,026	223,696.5						
12/22/2003	138.2	1.103	199,028	219,612.7						
12/23/2003	144.4	1.101	207,953	229,032.2						
12/24/2003	130.1	1.101	187,325	206,204.6						
12/25/2003	118.7	1.108	170,868	189,287.4						
12/26/2003	108.0	1.105	155,574	171,878.0						
12/27/2003	128.2	1.106	184,619	204,161.3						
12/28/2003	127.3	1.115	183,338	204,462.1						
12/29/2003	117.3	1.117	168,861	188,646.0						
12/30/2003	48.6	1.110	70,049	77,773.2						
12/31/2003	0.0	1.111	7	8.1	5,055,003	5,622,556	1.112	23,431,482	25,931,286	1.107
1/1/2004	41.3	1.111	59,504	66,085.3						
1/2/2004	79.2	1.113	114,050	126,984.9						
1/3/2004	0.0	1.114	14	15.1						
1/4/2004	60.6	1.114	87,316	97,305.7						
1/5/2004	180.6	1.114	260,134	289,789.0						
1/6/2004	119.8	1.089	172,471	187,804.9						
1/7/2004	0.0	1.100	14	14.9						
1/8/2004	18.2	1.100	26,275	28,898.5						
1/9/2004	172.3	1.093	248,129	271,271.2						
1/10/2004	213.1	1.077	306,849	330,376.7						
1/11/2004	203.6	1.083	293,171	317,595.2						
1/12/2004	195.4	1.087	281,409	306,011.4						
1/13/2004	197.4	1.086	284,215	308,707.1						
1/14/2004	194.0	1.088	279,384	303,999.2						
1/15/2004	213.1	1.105	306,826	338,988.4						
1/16/2004	207.6	1.101	298,915	328,986.6						
1/17/2004	213.5	1.106	307,495	339,944.5						
1/18/2004	228.9	1.097	329,582	361,396.2						
1/19/2004	227.1	1.090	327,041	356,420.2						
1/20/2004	230.2	1.111	331,442	368,353.0						
1/21/2004	210.6	1.103	303,318	334,670.0						
1/22/2004	218.4	1.090	314,476	342,779.3						
1/23/2004	172.8	1.090	248,879	271,187.4						
1/24/2004	282.6	1.091	406,982	443,982.9						
1/25/2004	275.6	1.093	396,805	433,653.1						
1/26/2004	272.2	1.199	391,924	469,735.9						
1/27/2004	255.0	1.085	367,259	398,520.3						
1/28/2004	229.0	1.099	329,694	362,390.6						
1/29/2004	190.4	1.092	274,196	299,490.9						
1/30/2004	225.7	1.100	325,033	357,559.9						
1/31/2004	230.1	1.095	331,306	362,859.5	8,004,107	8,805,778	1.100	23,060,375	25,496,844	1.106

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2004	207.1	1.101	298,253	328,390.3						
2/2/2004	218.6	1.105	314,732	347,762.5						
2/3/2004	226.0	1.092	325,417	355,354.9						
2/4/2004	185.9	1.096	267,714	293,289.2						
2/5/2004	225.1	1.104	324,122	357,677.9						
2/6/2004	0.0	0.000	0	0.0						
2/7/2004	214.6	1.090	309,069	336,854.4						
2/8/2004	220.0	1.105	316,736	349,995.3						
2/9/2004	220.0	1.107	316,731	350,508.0						
2/10/2004	231.7	1.101	333,630	367,273.7						
2/11/2004	244.9	1.084	352,674	382,464.8						
2/12/2004	230.1	1.094	331,309	362,368.8						
2/13/2004	230.4	1.100	331,741	365,025.5						
2/14/2004	248.6	1.094	357,997	391,577.3						
2/15/2004	221.5	1.109	318,971	353,695.2						
2/16/2004	204.7	1.111	294,797	327,396.0						
2/17/2004	204.6	1.103	294,614	324,901.3						
2/18/2004	204.2	1.105	294,024	324,807.2						
2/19/2004	119.6	1.099	172,240	189,248.0						
2/20/2004	187.5	1.096	270,005	296,027.5						
2/21/2004	224.3	1.086	322,972	350,901.9						
2/22/2004	230.1	1.091	331,345	361,394.3						
2/23/2004	231.9	1.096	333,982	365,975.8						
2/24/2004	173.8	1.093	250,274	273,459.8						
2/25/2004	203.3	1.097	292,820	321,090.3						
2/26/2004	207.5	1.093	298,772	326,688.2						
2/27/2004	202.9	1.099	292,118	320,966.4						
2/28/2004	162.6	1.099	234,202	257,294.1						
2/29/2004	181.4	1.087	261,188	283,792.2	8,442,449	9,266,181	1.098	21,501,559	23,694,515	1.102
3/1/2004	179.8	1.101	258,982	285,155.1						
3/2/2004	173.3	1.083	249,566	270,347.7						
3/3/2004	182.3	1.097	262,509	288,039.6						
3/4/2004	168.7	1.107	242,945	269,032.2						
3/5/2004	200.3	1.110	288,463	320,093.2						
3/6/2004	211.5	1.111	304,559	338,336.7						
3/7/2004	269.5	1.102	388,146	427,741.8						
3/8/2004	235.1	1.103	338,478	373,187.0						
3/9/2004	225.5	1.102	324,670	357,675.1						
3/10/2004	225.3	1.093	324,401	354,483.8						
3/11/2004	240.4	1.099	346,170	380,429.9						
3/12/2004	250.0	1.098	359,935	395,230.1						
3/13/2004	224.6	1.098	323,463	355,077.4						
3/14/2004	249.0	1.094	358,548	392,272.8						
3/15/2004	215.7	1.098	310,589	341,078.6						
3/16/2004	200.2	1.098	288,346	316,652.3						
3/17/2004	237.7	1.097	342,249	375,415.2						
3/18/2004	257.8	1.097	371,184	407,154.9						
3/19/2004	195.3	1.091	281,172	306,660.3						
3/20/2004	177.2	1.101	255,154	280,835.3						
3/21/2004	173.8	1.105	250,231	276,429.5						
3/22/2004	192.9	1.114	277,795	309,436.0						
3/23/2004	258.8	1.106	372,711	412,242.9						
3/24/2004	151.8	1.113	218,524	243,229.9						
3/25/2004	187.7	1.112	270,224	300,521.0						
3/26/2004	186.3	1.119	268,233	300,145.7						
3/27/2004	206.3	1.107	297,122	328,902.7						
3/28/2004	198.6	1.106	286,019	316,401.5						
3/29/2004	170.0	1.106	244,793	270,628.2						
3/30/2004	129.4	1.108	186,394	206,447.6						
3/31/2004	148.0	1.127	213,060	240,042.4	9,104,633	10,039,327	1.103	25,551,189	28,111,285	1.100

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2004	209.0	1.143	300,993	344,007.1						
4/2/2004	213.9	1.129	307,955	347,685.6						
4/3/2004	233.2	1.118	335,784	375,536.3						
4/4/2004	206.5	1.115	297,393	331,500.3						
4/5/2004	217.0	1.112	312,412	347,321.3						
4/6/2004	214.4	1.117	308,686	344,921.0						
4/7/2004	218.4	1.104	314,518	347,165.5						
4/8/2004	195.5	1.090	281,474	306,919.7						
4/9/2004	229.0	1.115	329,711	367,772.7						
4/10/2004	224.9	1.107	323,833	358,357.3						
4/11/2004	194.6	1.109	280,163	310,664.2						
4/12/2004	124.1	1.082	178,636	193,294.4						
4/13/2004	216.3	1.107	311,507	344,825.9						
4/14/2004	177.2	1.089	255,217	277,919.9						
4/15/2004	174.7	1.092	251,546	274,783.8						
4/16/2004	173.2	1.094	249,414	272,885.0						
4/17/2004	183.4	1.111	264,144	293,479.4						
4/18/2004	203.5	1.100	293,036	322,266.0						
4/19/2004	242.1	1.107	348,632	385,866.6						
4/20/2004	265.0	1.108	381,591	422,669.5						
4/21/2004	232.6	1.105	334,978	369,998.3						
4/22/2004	252.4	1.100	363,410	399,899.1						
4/23/2004	261.2	1.103	376,117	415,034.2						
4/24/2004	247.4	1.108	356,267	394,908.4						
4/25/2004	244.5	1.109	352,053	390,256.8						
4/26/2004	241.6	1.107	347,908	385,154.9						
4/27/2004	245.8	1.092	353,979	386,566.5						
4/28/2004	228.5	1.104	329,036	363,225.4						
4/29/2004	149.8	1.109	215,683	239,117.5						
4/30/2004	159.5	1.124	229,721	258,219.7	9,185,799	10,172,222	1.107	26,732,881	29,477,730	1.103
5/1/2004	233.8	1.118	336,672	376,419.7						
5/2/2004	255.4	1.094	367,739	402,428.9						
5/3/2004	252.3	1.105	363,274	401,460.8						
5/4/2004	220.3	1.098	317,189	348,242.1						
5/5/2004	187.5	1.094	270,008	295,421.0						
5/6/2004	169.2	1.099	243,676	267,868.4						
5/7/2004	188.5	1.108	271,403	300,628.0						
5/8/2004	221.0	1.093	318,307	347,825.1						
5/9/2004	185.4	1.096	266,969	292,723.1						
5/10/2004	221.8	1.110	319,445	354,734.4						
5/11/2004	239.1	1.103	344,236	379,820.2						
5/12/2004	244.9	1.101	352,714	388,411.0						
5/13/2004	245.0	1.097	352,795	387,112.0						
5/14/2004	253.4	1.086	364,878	396,199.1						
5/15/2004	270.0	1.112	388,866	432,282.5						
5/16/2004	252.8	1.096	364,012	398,810.1						
5/17/2004	208.4	1.097	300,085	329,336.7						
5/18/2004	241.7	1.108	348,049	385,732.9						
5/19/2004	287.7	1.104	414,286	457,441.0						
5/20/2004	211.9	1.102	305,076	336,130.8						
5/21/2004	190.0	1.109	273,655	303,412.4						
5/22/2004	249.8	1.112	359,698	399,891.3						
5/23/2004	249.9	1.099	359,913	395,490.1						
5/24/2004	262.1	1.098	377,368	414,452.8						
5/25/2004	287.3	1.096	413,772	453,368.6						
5/26/2004	253.4	1.096	364,873	400,038.5						
5/27/2004	221.9	1.102	319,515	352,211.2						
5/28/2004	218.5	1.103	314,629	347,186.0						
5/29/2004	219.1	1.106	315,470	348,985.8						
5/30/2004	220.0	1.108	316,785	350,953.7						
5/31/2004	175.6	1.106	252,817	279,607.8	10,278,173	11,324,626	1.102	28,568,605	31,536,175	1.104

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2004	41.9	1.113	60,301	67,116.4						
6/2/2004	0.0	0.000	0	0.0						
6/3/2004	0.0	0.000	0	0.0						
6/4/2004	0.0	0.000	0	0.0						
6/5/2004	169.4	1.113	243,886	271,513.0						
6/6/2004	161.9	1.091	233,149	254,404.4						
6/7/2004	79.7	1.100	114,725	126,246.0						
6/8/2004	122.8	1.100	176,800	194,437.9						
6/9/2004	249.3	1.081	359,015	387,984.0						
6/10/2004	246.9	1.092	355,523	388,064.5						
6/11/2004	248.0	1.092	357,091	389,945.5						
6/12/2004	250.3	1.098	360,472	395,781.3						
6/13/2004	251.6	1.097	362,367	397,499.7						
6/14/2004	254.9	1.094	367,086	401,594.4						
6/15/2004	263.0	1.103	378,775	417,929.5						
6/16/2004	268.1	1.095	386,026	422,801.1						
6/17/2004	271.1	1.085	390,453	423,626.2						
6/18/2004	240.2	1.091	345,921	377,275.8						
6/19/2004	276.4	1.088	397,957	432,892.8						
6/20/2004	283.7	1.094	408,551	446,954.6						
6/21/2004	257.8	1.089	371,169	404,104.8						
6/22/2004	235.2	1.094	338,710	370,567.1						
6/23/2004	91.7	1.096	132,106	144,821.9						
6/24/2004	33.7	1.095	48,467	53,072.1						
6/25/2004	266.8	1.105	384,138	424,618.1						
6/26/2004	270.7	1.078	389,802	420,394.8						
6/27/2004	284.0	1.097	408,959	448,549.9						
6/28/2004	294.5	1.091	424,020	462,807.7						
6/29/2004	284.1	1.103	409,090	451,176.0						
6/30/2004	0.0	0.000	0	0.0	8,204,559	8,976,180	1.094	27,668,531	30,473,028	1.101
7/1/2004	0.0	0.000	0	0.0						
7/2/2004	249.9	1.099	359,881	395,609.7						
7/3/2004	253.3	1.096	364,793	399,933.8						
7/4/2004	248.6	1.100	357,970	393,839.4						
7/5/2004	253.3	1.097	364,737	400,082.9						
7/6/2004	258.3	1.089	371,926	405,111.5						
7/7/2004	256.5	1.084	369,359	400,367.8						
7/8/2004	202.6	1.091	291,683	318,084.0						
7/9/2004	190.9	1.090	274,940	299,612.2						
7/10/2004	217.5	1.095	313,224	342,915.6						
7/11/2004	249.2	1.087	358,806	390,195.8						
7/12/2004	236.9	1.089	341,156	371,632.1						
7/13/2004	246.3	1.091	354,736	386,984.5						
7/14/2004	249.1	1.098	358,685	393,748.6						
7/15/2004	236.2	1.091	340,085	371,055.2						
7/16/2004	231.0	1.094	332,638	364,066.6						
7/17/2004	240.4	1.100	346,133	380,609.6						
7/18/2004	250.0	1.105	359,958	397,887.2						
7/19/2004	247.3	1.104	356,133	393,245.9						
7/20/2004	175.7	1.112	252,966	281,221.1						
7/21/2004	181.0	1.116	260,609	290,786.1						
7/22/2004	213.0	1.110	306,681	340,488.8						
7/23/2004	279.1	1.099	401,839	441,522.7						
7/24/2004	285.0	1.099	410,444	451,033.2						
7/25/2004	268.1	1.107	386,123	427,412.0						
7/26/2004	101.6	1.092	146,302	159,725.1						
7/27/2004	0.0	0.000	0	0.0						
7/28/2004	0.0	0.000	0	0.0						
7/29/2004	0.0	0.000	0	0.0						
7/30/2004	0.0	0.000	0	0.0						
7/31/2004	265.1	1.096	381,725	418,534.9	8,763,531	9,615,706	1.097	27,246,263	29,916,512	1.098

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2004	268.0	1.100	385,974	424,617.3						
8/2/2004	240.0	1.088	345,652	376,022.2						
8/3/2004	246.2	1.086	354,554	385,013.5						
8/4/2004	263.2	1.085	379,034	411,164.3						
8/5/2004	283.2	1.083	407,824	441,510.3						
8/6/2004	200.1	1.100	288,202	317,060.3						
8/7/2004	203.9	1.099	293,549	322,515.0						
8/8/2004	184.7	1.104	266,016	293,796.5						
8/9/2004	151.8	1.103	218,645	241,085.7						
8/10/2004	104.0	1.125	149,754	168,416.9						
8/11/2004	85.2	1.031	122,683	126,538.0						
8/12/2004	153.6	1.088	221,168	240,573.6						
8/13/2004	161.3	1.095	232,220	254,182.3						
8/14/2004	167.8	1.101	241,590	265,906.0						
8/15/2004	172.2	1.097	247,975	271,922.1						
8/16/2004	216.5	1.104	311,785	344,224.9						
8/17/2004	239.5	1.120	344,941	386,495.1						
8/18/2004	196.8	1.113	283,406	315,508.2						
8/19/2004	237.5	1.108	342,038	379,019.4						
8/20/2004	252.7	1.114	363,920	405,272.0						
8/21/2004	248.0	1.126	357,176	402,180.3						
8/22/2004	252.6	1.100	363,794	400,173.9						
8/23/2004	287.3	1.099	413,671	454,649.4						
8/24/2004	268.5	1.109	386,710	429,030.7						
8/25/2004	254.2	1.094	366,073	400,466.7						
8/26/2004	218.7	1.102	314,886	347,099.0						
8/27/2004	177.6	1.100	255,708	281,208.3						
8/28/2004	116.4	1.102	167,586	184,722.6						
8/29/2004	200.3	1.116	288,449	321,971.7						
8/30/2004	220.0	1.085	316,821	343,767.1						
8/31/2004	290.7	1.189	418,666	497,969.0	9,450,470	10,434,082	1.104	26,418,560	29,025,968	1.099
9/1/2004	240.0	1.093	345,604	377,765.7						
9/2/2004	176.1	1.097	253,539	278,162.8						
9/3/2004	197.8	1.106	284,891	315,114.6						
9/4/2004	243.7	1.108	350,974	388,733.6						
9/5/2004	243.0	1.098	349,902	384,255.9						
9/6/2004	247.9	1.104	357,029	394,051.5						
9/7/2004	254.5	1.102	366,410	403,652.8						
9/8/2004	247.7	1.104	356,696	393,622.6						
9/9/2004	240.5	1.107	346,258	383,429.5						
9/10/2004	240.0	1.124	345,616	388,319.6						
9/11/2004	240.0	1.112	345,615	384,432.4						
9/12/2004	240.5	1.108	346,321	383,781.3						
9/13/2004	246.4	1.101	354,799	390,704.5						
9/14/2004	166.1	1.128	239,208	269,941.2						
9/15/2004	141.0	1.123	202,993	227,886.7						
9/16/2004	179.6	1.111	258,560	287,193.0						
9/17/2004	230.0	1.112	331,252	368,266.6						
9/18/2004	237.2	1.094	341,623	373,898.6						
9/19/2004	245.0	1.100	352,732	388,085.4						
9/20/2004	216.1	1.110	311,226	345,394.5						
9/21/2004	165.9	1.115	238,856	266,400.5						
9/22/2004	164.2	1.109	236,499	262,241.3						
9/23/2004	188.1	1.103	270,866	298,894.5						
9/24/2004	217.3	1.116	312,907	349,256.2						
9/25/2004	199.7	1.118	287,513	321,421.8						
9/26/2004	155.9	1.122	224,425	251,898.6						
9/27/2004	194.0	1.111	279,339	310,447.5						
9/28/2004	72.4	1.118	104,294	116,638.8						
9/29/2004	276.2	1.099	397,678	437,150.6						
9/30/2004	249.4	1.102	359,179	395,887.9	9,152,803	10,136,931	1.108	27,366,804	30,186,719	1.103

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2004	261.0	1.122	375,906	421,896.2						
10/2/2004	275.1	1.111	396,110	439,898.0						
10/3/2004	275.0	1.114	395,928	441,114.2						
10/4/2004	271.5	1.108	390,982	433,190.1						
10/5/2004	258.5	1.104	372,260	410,906.8						
10/6/2004	221.1	1.116	318,373	355,171.8						
10/7/2004	226.3	1.121	325,932	365,393.8						
10/8/2004	273.6	1.120	394,051	441,336.8						
10/9/2004	0.0	0.000	0	0.0						
10/10/2004	282.6	1.093	406,993	445,012.5						
10/11/2004	237.7	1.102	342,305	377,145.3						
10/12/2004	225.0	1.109	323,950	359,275.4						
10/13/2004	224.9	1.106	323,877	358,059.9						
10/14/2004	226.0	1.107	325,493	360,301.7						
10/15/2004	258.2	1.111	371,861	413,216.5						
10/16/2004	247.9	1.099	357,041	392,473.4						
10/17/2004	235.7	1.110	339,376	376,876.7						
10/18/2004	201.0	1.135	289,415	328,411.3						
10/19/2004	180.0	1.112	259,219	288,212.6						
10/20/2004	207.6	1.110	298,977	331,898.0						
10/21/2004	186.8	1.131	268,996	304,293.8						
10/22/2004	229.4	1.129	330,333	372,810.0						
10/23/2004	223.5	1.105	321,880	355,697.1						
10/24/2004	254.7	1.095	366,751	401,650.7						
10/25/2004	240.2	1.096	345,840	378,932.6						
10/26/2004	214.9	1.102	309,508	340,949.0						
10/27/2004	61.0	1.113	87,833	97,763.6						
10/28/2004	120.4	1.115	173,314	193,291.2						
10/29/2004	116.9	1.089	168,368	183,336.4						
10/30/2004	132.7	1.086	191,130	207,559.4						
10/31/2004	205.1	1.100	295,332	324,885.3	9,467,335	10,500,960	1.109	28,070,608	31,071,973	1.107
11/1/2004	263.5	1.118	379,459	424,117.2						
11/2/2004	280.3	1.098	403,656	443,106.9						
11/3/2004	265.4	1.092	382,190	417,511.3						
11/4/2004	274.1	1.113	394,701	439,446.1						
11/5/2004	244.0	1.093	351,315	383,876.1						
11/6/2004	223.7	1.095	322,147	352,885.5						
11/7/2004	242.7	1.088	349,522	380,266.1						
11/8/2004	255.9	1.084	368,490	399,364.5						
11/9/2004	277.2	1.087	399,210	433,814.6						
11/10/2004	279.8	1.100	402,941	443,069.4						
11/11/2004	210.8	1.097	303,564	333,009.4						
11/12/2004	191.0	1.103	275,084	303,522.0						
11/13/2004	262.5	1.088	377,961	411,266.8						
11/14/2004	270.5	1.099	389,521	428,223.3						
11/15/2004	256.9	1.095	369,865	404,872.9						
11/16/2004	261.9	1.100	377,082	414,935.4						
11/17/2004	236.0	1.105	339,903	375,600.4						
11/18/2004	258.9	1.084	372,858	404,262.7						
11/19/2004	274.8	1.097	395,782	434,010.3						
11/20/2004	284.2	1.087	409,298	444,977.2						
11/21/2004	283.8	1.094	408,702	447,017.4						
11/22/2004	282.1	1.093	406,199	444,082.7						
11/23/2004	191.2	1.098	275,399	302,504.5						
11/24/2004	136.1	1.095	195,915	214,497.3						
11/25/2004	251.3	1.097	361,826	397,093.6						
11/26/2004	284.0	1.096	408,920	448,309.6						
11/27/2004	258.0	1.091	371,564	405,209.3						
11/28/2004	258.1	1.096	371,694	407,415.0						
11/29/2004	271.3	1.094	390,701	427,376.0						
11/30/2004	203.7	1.095	293,358	321,277.3	10,848,827	11,886,921	1.096	29,468,965	32,524,812	1.104

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2004	67.7	1.099	97,422	107,100.4						
12/2/2004	126.4	1.087	182,060	197,909.8						
12/3/2004	139.4	1.088	200,695	218,399.8						
12/4/2004	144.5	1.092	208,135	227,296.4						
12/5/2004	148.9	1.093	214,449	234,330.9						
12/6/2004	148.9	1.080	214,461	231,562.3						
12/7/2004	133.1	1.073	191,723	205,667.1						
12/8/2004	94.5	1.115	136,069	151,737.1						
12/9/2004	0.0	1.115	7	8.2						
12/10/2004	0.0	1.112	7	8.1						
12/11/2004	93.6	1.115	134,837	150,301.3						
12/12/2004	128.0	1.111	184,284	204,789.3						
12/13/2004	140.8	1.102	202,800	223,580.9						
12/14/2004	145.4	1.093	209,440	228,917.5						
12/15/2004	121.8	1.103	175,374	193,447.2						
12/16/2004	140.9	1.100	202,924	223,151.3						
12/17/2004	148.9	1.102	214,469	236,390.8						
12/18/2004	155.3	1.095	223,681	244,906.5						
12/19/2004	153.6	1.100	221,158	243,226.8						
12/20/2004	151.6	1.093	218,373	238,789.0						
12/21/2004	145.8	1.098	210,003	230,487.0						
12/22/2004	142.3	1.095	204,919	224,290.3						
12/23/2004	143.6	1.091	206,762	225,642.9						
12/24/2004	141.4	1.092	203,548	222,307.2						
12/25/2004	146.1	1.099	210,383	231,311.5						
12/26/2004	146.3	1.099	210,607	231,458.6						
12/27/2004	144.9	1.095	208,656	228,513.3						
12/28/2004	144.8	1.093	208,557	227,911.3						
12/29/2004	113.4	1.095	163,288	178,760.6						
12/30/2004	90.4	1.098	130,117	142,883.3						
12/31/2004	89.4	1.111	128,726	142,967.5	5,517,934	6,048,054	1.096	25,834,096	28,435,935	1.101
1/1/2005	153.1	1.105	220,471	243,573.6						
1/2/2005	197.5	1.104	284,374	313,888.6						
1/3/2005	250.3	1.110	360,428	400,058.7						
1/4/2005	175.9	1.108	253,317	280,647.8						
1/5/2005	152.0	1.109	218,871	242,774.3						
1/6/2005	163.9	1.104	236,071	260,684.4						
1/7/2005	255.3	1.106	367,577	406,406.3						
1/8/2005	271.6	1.115	391,052	436,168.1						
1/9/2005	199.7	1.115	287,592	320,652.2						
1/10/2005	236.1	1.098	339,977	373,243.0						
1/11/2005	289.1	1.086	416,274	452,120.2						
1/12/2005	265.0	1.081	381,562	412,410.8						
1/13/2005	254.2	1.095	366,058	400,833.6						
1/14/2005	241.0	1.089	347,034	377,791.7						
1/15/2005	183.0	1.097	263,463	288,892.7						
1/16/2005	180.0	1.093	259,141	283,362.5						
1/17/2005	209.3	1.093	301,354	329,489.4						
1/18/2005	286.6	1.092	412,673	450,442.5						
1/19/2005	266.1	1.087	383,233	416,675.5						
1/20/2005	252.6	1.103	363,734	401,066.1						
1/21/2005	284.0	1.101	408,913	450,368.2						
1/22/2005	285.6	1.092	411,299	449,075.9						
1/23/2005	298.6	1.095	430,003	470,717.0						
1/24/2005	299.7	1.096	431,525	473,153.8						
1/25/2005	279.4	1.099	402,350	442,078.7						
1/26/2005	281.4	1.104	405,231	447,485.7						
1/27/2005	271.7	1.091	391,208	426,683.7						
1/28/2005	289.5	1.095	416,847	456,358.9						
1/29/2005	293.2	1.089	422,229	459,739.8						
1/30/2005	293.3	1.098	422,419	463,782.8						
1/31/2005	295.0	1.099	424,773	466,786.2	11,021,051	12,097,413	1.098	27,387,812	30,032,388	1.097

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2005	295.0	1.109	424,828	471,185.4						
2/2/2005	294.6	1.111	424,165	471,294.9						
2/3/2005	294.4	1.096	423,910	464,579.5						
2/4/2005	289.0	1.088	416,165	452,774.2						
2/5/2005	289.9	1.096	417,504	457,726.0						
2/6/2005	289.7	1.096	417,114	457,055.2						
2/7/2005	284.5	1.098	409,701	449,680.5						
2/8/2005	202.9	1.104	292,212	322,478.1						
2/9/2005	206.4	1.089	297,229	323,696.3						
2/10/2005	175.1	1.083	252,149	273,062.1						
2/11/2005	26.7	1.071	38,435	41,158.2						
2/12/2005	148.0	1.079	213,075	229,840.7						
2/13/2005	228.7	1.096	329,327	360,787.4						
2/14/2005	290.0	1.086	417,561	453,647.8						
2/15/2005	293.2	1.110	422,267	468,786.0						
2/16/2005	289.5	1.096	416,876	456,722.2						
2/17/2005	275.3	1.092	396,433	432,881.5						
2/18/2005	280.2	1.095	403,530	441,948.5						
2/19/2005	277.4	1.100	399,491	439,543.6						
2/20/2005	274.8	1.094	395,694	433,056.9						
2/21/2005	221.6	1.096	319,103	349,756.0						
2/22/2005	215.0	1.087	309,585	336,439.1						
2/23/2005	212.3	1.097	305,766	335,315.6						
2/24/2005	188.9	1.096	272,048	298,195.4						
2/25/2005	188.5	1.081	271,381	293,292.7						
2/26/2005	15.9	1.085	22,937	24,875.6						
2/27/2005	141.5	1.085	203,796	221,167.8						
2/28/2005	225.1	1.092	324,163	353,907.3	9,236,445	10,114,855	1.095	25,775,430	28,260,322	1.096
3/1/2005	236.0	1.086	339,851	369,208.8						
3/2/2005	248.3	1.088	357,526	388,969.2						
3/3/2005	259.3	1.088	373,397	406,436.9						
3/4/2005	166.6	1.092	239,857	261,875.8						
3/5/2005	153.6	1.085	221,178	240,016.2						
3/6/2005	178.4	1.093	256,932	280,898.5						
3/7/2005	270.5	1.092	389,533	425,556.1						
3/8/2005	279.1	1.079	401,872	433,662.3						
3/9/2005	253.4	1.093	364,950	398,929.3						
3/10/2005	184.0	1.088	264,946	288,373.7						
3/11/2005	263.6	1.098	379,564	416,885.1						
3/12/2005	275.5	1.092	396,787	433,315.5						
3/13/2005	274.9	1.087	395,883	430,330.9						
3/14/2005	232.5	1.091	334,867	365,413.2						
3/15/2005	281.2	1.094	404,970	443,063.8						
3/16/2005	283.1	1.094	407,697	446,038.8						
3/17/2005	275.0	1.104	396,030	437,057.6						
3/18/2005	284.5	1.094	409,684	448,345.9						
3/19/2005	249.9	1.097	359,896	394,865.5						
3/20/2005	267.5	1.116	385,230	429,807.6						
3/21/2005	271.6	1.114	391,167	435,745.2						
3/22/2005	273.1	1.100	393,223	432,446.9						
3/23/2005	254.4	1.115	366,380	408,574.3						
3/24/2005	274.0	1.113	394,544	439,156.9						
3/25/2005	272.2	1.116	391,947	437,462.8						
3/26/2005	268.5	1.106	386,648	427,456.3						
3/27/2005	286.0	1.105	411,801	455,133.4						
3/28/2005	270.8	1.104	389,886	430,517.2						
3/29/2005	278.3	1.103	400,722	441,996.2						
3/30/2005	219.6	1.110	316,217	351,053.1						
3/31/2005	280.1	1.111	403,296	448,193.4	11,326,482	12,446,787	1.099	31,583,978	34,659,054	1.097

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2005	282.8	1.103	407,253	449,156.9						
4/2/2005	294.1	1.102	423,544	466,944.7						
4/3/2005	250.8	1.111	361,182	401,218.8						
4/4/2005	207.6	1.113	298,933	332,796.2						
4/5/2005	221.0	1.125	318,269	358,006.8						
4/6/2005	221.7	1.125	319,313	359,095.7						
4/7/2005	224.7	1.115	323,581	360,910.1						
4/8/2005	116.9	1.127	168,313	189,717.2						
4/9/2005	84.1	1.129	121,121	136,689.6						
4/10/2005	156.4	1.094	225,216	246,294.1						
4/11/2005	193.5	1.099	278,570	306,135.5						
4/12/2005	289.1	1.098	416,308	457,080.8						
4/13/2005	292.5	1.106	421,193	465,814.0						
4/14/2005	287.3	1.116	413,736	461,709.8						
4/15/2005	235.2	1.118	338,670	378,652.9						
4/16/2005	238.9	1.118	344,033	384,540.0						
4/17/2005	245.4	1.109	353,434	391,904.1						
4/18/2005	278.5	1.115	401,006	447,078.6						
4/19/2005	219.9	1.116	316,596	353,239.2						
4/20/2005	0.0	1.129	14	15.2						
4/21/2005	3.2	1.128	4,566	5,151.7						
4/22/2005	177.2	1.130	255,175	288,283.7						
4/23/2005	148.2	1.132	213,451	241,721.4						
4/24/2005	135.0	1.124	194,470	218,587.3						
4/25/2005	0.0	1.128	14	15.3						
4/26/2005	0.0	1.128	31	35.1						
4/27/2005	201.1	1.127	289,596	326,392.3						
4/28/2005	164.4	1.115	236,731	263,960.4						
4/29/2005	202.7	1.116	291,932	325,753.5						
4/30/2005	211.2	1.121	304,169	340,973.3	8,040,418	8,957,874	1.114	28,603,345	31,519,516	1.102
5/1/2005	196.1	1.119	282,420	315,895.6						
5/2/2005	167.5	1.114	241,196	268,783.6						
5/3/2005	89.1	1.108	128,375	142,207.2						
5/4/2005	185.1	1.108	266,602	295,467.2						
5/5/2005	28.2	1.104	40,641	44,862.1						
5/6/2005	108.4	1.107	156,085	172,854.4						
5/7/2005	103.5	1.112	149,019	165,719.2						
5/8/2005	103.8	1.120	149,529	167,520.3						
5/9/2005	109.0	1.120	156,998	175,798.5						
5/10/2005	105.2	1.101	151,528	166,809.0						
5/11/2005	199.4	1.099	287,172	315,680.7						
5/12/2005	240.6	1.100	346,408	380,922.6						
5/13/2005	274.3	1.090	395,021	430,575.8						
5/14/2005	283.4	1.099	408,151	448,688.0						
5/15/2005	292.0	1.103	420,477	463,984.3						
5/16/2005	235.5	1.088	339,103	369,035.8						
5/17/2005	196.0	1.089	282,201	307,242.0						
5/18/2005	209.0	1.098	301,031	330,486.3						
5/19/2005	219.0	1.100	315,394	346,969.2						
5/20/2005	222.4	1.104	320,223	353,545.4						
5/21/2005	218.0	1.119	313,986	351,307.2						
5/22/2005	159.1	1.118	229,054	256,038.7						
5/23/2005	126.8	1.121	182,662	204,777.7						
5/24/2005	130.0	1.115	187,229	208,763.0						
5/25/2005	193.2	1.119	278,213	311,206.8						
5/26/2005	244.9	1.106	352,711	389,989.0						
5/27/2005	265.8	1.111	382,734	425,115.9						
5/28/2005	287.0	1.113	413,231	460,079.0						
5/29/2005	290.2	1.116	417,931	466,391.6						
5/30/2005	289.4	1.117	416,790	465,579.6						
5/31/2005	282.1	1.113	406,209	452,005.3	8,718,325	9,654,301	1.107	28,085,225	31,058,962	1.106

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2005	253.6	1.109	365,149	404,914.0						
6/2/2005	197.7	1.102	284,757	313,939.8						
6/3/2005	196.0	1.112	282,309	313,978.5						
6/4/2005	209.0	1.118	300,998	336,490.7						
6/5/2005	280.1	1.121	403,407	452,353.6						
6/6/2005	150.3	1.118	216,435	242,057.1						
6/7/2005	211.9	1.122	305,105	342,241.7						
6/8/2005	181.7	1.107	261,697	289,769.8						
6/9/2005	170.1	1.111	244,993	272,266.9						
6/10/2005	170.0	1.115	244,741	272,901.4						
6/11/2005	170.6	1.118	245,596	274,693.5						
6/12/2005	220.2	1.117	317,066	354,263.3						
6/13/2005	264.5	1.115	380,899	424,526.0						
6/14/2005	265.3	1.117	382,099	426,688.6						
6/15/2005	245.8	1.112	353,977	393,739.7						
6/16/2005	128.1	1.121	184,444	206,823.2						
6/17/2005	121.1	1.123	174,405	195,880.6						
6/18/2005	168.2	1.122	242,172	271,809.0						
6/19/2005	254.7	1.111	366,821	407,657.0						
6/20/2005	252.1	1.118	363,013	405,911.0						
6/21/2005	254.9	1.112	366,999	408,202.5						
6/22/2005	130.3	1.109	187,703	208,253.0						
6/23/2005	288.5	1.110	415,370	461,151.6						
6/24/2005	291.8	1.119	420,237	470,111.1						
6/25/2005	254.2	1.119	366,115	409,566.3						
6/26/2005	194.6	1.119	280,213	313,498.4						
6/27/2005	199.8	1.121	287,731	322,638.4						
6/28/2005	200.0	1.124	288,006	323,598.6						
6/29/2005	173.3	1.126	249,514	280,904.8						
6/30/2005	196.0	1.130	282,236	318,990.3	9,064,206	10,119,820	1.116	25,822,949	28,731,995	1.113
7/1/2005	247.7	1.121	356,641	399,702.5						
7/2/2005	257.1	1.120	370,229	414,600.8						
7/3/2005	285.5	1.114	411,102	457,861.4						
7/4/2005	282.7	1.107	407,150	450,912.5						
7/5/2005	280.2	1.111	403,543	448,488.9						
7/6/2005	196.5	1.121	282,939	317,192.0						
7/7/2005	86.8	1.124	124,995	140,463.1						
7/8/2005	227.9	1.131	328,151	371,139.2						
7/9/2005	270.3	1.114	389,258	433,633.0						
7/10/2005	279.5	1.112	402,455	447,572.4						
7/11/2005	277.1	1.107	398,960	441,754.9						
7/12/2005	268.0	1.108	385,850	427,524.2						
7/13/2005	114.1	1.119	164,374	183,909.3						
7/14/2005	0.0	0.000	0	0.0						
7/15/2005	0.0	0.000	0	0.0						
7/16/2005	248.0	1.021	357,148	364,631.3						
7/17/2005	254.0	1.006	365,718	367,934.3						
7/18/2005	263.0	1.015	378,779	384,402.9						
7/19/2005	265.5	1.050	382,306	401,485.3						
7/20/2005	277.0	1.080	398,931	430,784.8						
7/21/2005	289.8	1.083	417,299	451,827.6						
7/22/2005	299.2	1.092	430,825	470,418.4						
7/23/2005	298.6	1.089	429,916	468,136.2						
7/24/2005	299.0	1.099	430,602	473,371.3						
7/25/2005	297.4	1.094	428,235	468,651.1						
7/26/2005	268.5	1.112	386,707	430,185.1						
7/27/2005	259.1	1.120	373,145	417,831.4						
7/28/2005	207.6	1.123	298,982	335,822.0						
7/29/2005	182.2	1.126	262,404	295,350.5						
7/30/2005	229.2	1.111	330,038	366,781.9						
7/31/2005	248.7	1.112	358,158	398,183.9	10,454,841	11,460,552	1.096	28,237,372	31,234,673	1.106

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2005	247.0	1.105	355,643	393,011.4						
8/2/2005	279.3	1.097	402,256	441,352.3						
8/3/2005	268.2	1.100	386,273	425,026.6						
8/4/2005	119.6	1.086	172,205	187,053.7						
8/5/2005	248.3	1.097	357,564	392,084.5						
8/6/2005	263.0	1.109	378,653	420,109.9						
8/7/2005	268.3	1.117	386,304	431,384.0						
8/8/2005	270.1	1.119	388,873	435,337.1						
8/9/2005	282.9	1.100	407,367	448,170.9						
8/10/2005	286.1	1.101	412,011	453,717.7						
8/11/2005	267.1	1.120	384,671	430,934.8						
8/12/2005	269.8	1.121	388,477	435,322.9						
8/13/2005	268.6	1.118	386,777	432,237.9						
8/14/2005	265.0	1.112	381,614	424,178.4						
8/15/2005	266.9	1.092	384,359	419,908.6						
8/16/2005	282.3	1.110	406,447	451,183.4						
8/17/2005	75.6	1.110	108,813	120,789.8						
8/18/2005	0.0	0.000	0	0.0						
8/19/2005	0.0	0.000	0	0.0						
8/20/2005	0.0	1.095	0	0.0						
8/21/2005	0.0	1.097	0	0.0						
8/22/2005	0.0	1.085	0	0.0						
8/23/2005	49.5	1.095	71,342	78,136.5						
8/24/2005	222.9	1.101	321,012	353,575.2						
8/25/2005	151.1	1.102	217,552	239,837.8						
8/26/2005	0.0	1.106	13	14.7						
8/27/2005	0.0	1.105	14	14.9						
8/28/2005	177.6	1.127	255,809	288,191.4						
8/29/2005	195.4	1.119	281,423	314,961.4						
8/30/2005	166.8	1.110	240,158	266,615.7						
8/31/2005	167.2	1.114	240,818	268,388.3	7,716,449	8,551,540	1.108	27,235,496	30,131,912	1.106
9/1/2005	224.3	1.036	323,061	334,847.8						
9/2/2005	227.3	1.009	327,322	330,131.8						
9/3/2005	125.2	1.007	180,351	181,603.5						
9/4/2005	22.2	1.010	31,947	32,256.3						
9/5/2005	136.4	1.020	196,476	200,322.2						
9/6/2005	147.1	1.066	211,875	225,790.9						
9/7/2005	156.0	1.078	224,702	242,310.6						
9/8/2005	223.7	1.098	322,100	353,821.8						
9/9/2005	299.7	1.113	431,638	480,301.5						
9/10/2005	299.9	1.114	431,856	481,270.3						
9/11/2005	299.9	1.117	431,841	482,369.2						
9/12/2005	298.9	1.118	430,446	481,398.4						
9/13/2005	288.7	1.105	415,704	459,314.9						
9/14/2005	263.5	1.107	379,497	420,202.6						
9/15/2005	296.4	1.095	426,808	467,451.7						
9/16/2005	300.0	1.104	431,972	476,877.3						
9/17/2005	299.9	1.116	431,882	482,006.6						
9/18/2005	299.7	1.111	431,513	479,626.1						
9/19/2005	300.0	1.107	431,957	478,019.7						
9/20/2005	286.3	1.117	412,226	460,290.6						
9/21/2005	181.6	1.105	261,497	289,052.7						
9/22/2005	0.0	0.000	0	0.0						
9/23/2005	0.0	0.000	0	0.0						
9/24/2005	0.0	0.000	0	0.0						
9/25/2005	0.0	0.000	0	0.0						
9/26/2005	94.6	1.105	136,289	150,664.8						
9/27/2005	295.1	1.104	424,935	469,044.0						
9/28/2005	154.7	1.057	222,812	235,438.9						
9/29/2005	183.2	1.083	263,767	285,766.5						
9/30/2005	111.8	1.087	160,934	174,972.9	8,375,409	9,155,154	1.093	26,546,699	29,167,245	1.099

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2005	0.0	1.088	14	14.7						
10/2/2005	0.0	1.085	14	14.7						
10/3/2005	0.0	1.085	12	13.3						
10/4/2005	0.0	1.084	14	14.7						
10/5/2005	5.1	1.086	7,346	7,979.0						
10/6/2005	182.1	1.077	262,156	282,318.1						
10/7/2005	201.7	1.072	290,405	311,439.1						
10/8/2005	204.5	1.112	294,419	327,440.8						
10/9/2005	0.0	1.089	14	14.7						
10/10/2005	83.8	1.087	120,709	131,268.1						
10/11/2005	251.9	1.085	362,803	393,742.0						
10/12/2005	273.4	1.089	393,714	428,924.6						
10/13/2005	300.0	1.108	431,943	478,756.6						
10/14/2005	296.0	1.114	426,265	474,974.9						
10/15/2005	289.2	1.113	416,431	463,578.3						
10/16/2005	205.5	1.108	295,930	327,971.3						
10/17/2005	165.0	1.103	237,615	262,141.7						
10/18/2005	290.7	1.109	418,635	464,094.8						
10/19/2005	287.7	1.086	414,243	449,785.9						
10/20/2005	298.6	1.098	430,043	472,033.7						
10/21/2005	263.1	1.110	378,883	420,685.8						
10/22/2005	0.0	1.075	408,033	438,703.7						
10/23/2005	0.0	1.094	417,787	456,890.7						
10/24/2005	253.6	1.100	365,243	401,919.5						
10/25/2005	211.7	1.098	304,780	334,616.5						
10/26/2005	205.9	1.100	296,562	326,345.5						
10/27/2005	0.0	1.099	367,526	403,972.0						
10/28/2005	0.0	1.103	324,492	358,019.8						
10/29/2005	220.2	1.101	317,141	349,275.5						
10/30/2005	215.3	1.090	309,976	337,974.6						
10/31/2005	188.8	1.103	271,851	299,809.2	8,564,997	9,404,734	1.098	24,656,855	27,111,427	1.100
11/1/2005	200.5	1.102	288,678	318,125.7						
11/2/2005	223.2	1.099	321,429	353,284.7						
11/3/2005	268.3	1.101	386,386	425,498.6						
11/4/2005	168.6	1.074	242,848	260,871.4						
11/5/2005	0.0	1.085	14	14.7						
11/6/2005	0.0	1.085	14	14.7						
11/7/2005	79.3	1.085	114,182	123,840.9						
11/8/2005	277.0	1.099	398,875	438,220.9						
11/9/2005	293.6	1.109	422,748	468,942.3						
11/10/2005	287.3	1.104	413,679	456,638.7						
11/11/2005	281.9	1.108	405,984	449,750.0						
11/12/2005	2.5	1.095	3,582	3,921.1						
11/13/2005	73.2	1.097	105,347	115,590.4						
11/14/2005	276.5	1.102	398,194	438,960.3						
11/15/2005	144.1	1.098	207,459	227,792.5						
11/16/2005	96.7	1.099	139,320	153,142.1						
11/17/2005	289.8	1.098	417,359	458,063.6						
11/18/2005	288.3	1.088	415,129	451,814.2						
11/19/2005	289.8	1.098	417,315	458,189.3						
11/20/2005	278.4	1.101	400,950	441,360.7						
11/21/2005	240.5	1.103	346,328	382,027.5						
11/22/2005	201.1	1.101	289,632	318,942.4						
11/23/2005	187.3	1.113	269,732	300,186.9						
11/24/2005	201.1	1.098	289,635	318,023.4						
11/25/2005	230.1	1.083	331,397	358,960.6						
11/26/2005	200.9	1.098	289,246	317,609.9						
11/27/2005	221.2	1.080	318,579	344,084.5						
11/28/2005	237.1	1.097	341,409	374,385.8						
11/29/2005	192.9	1.076	277,710	298,759.3						
11/30/2005	163.5	1.071	235,422	252,028.0	8,488,581	9,309,045	1.097	25,428,988	27,868,933	1.096

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2005	187.7	1.088	270,236	293,919.9						
12/2/2005	38.7	1.093	55,720	60,922.3						
12/3/2005	57.7	1.087	83,059	90,260.4						
12/4/2005	177.9	1.060	256,157	271,518.1						
12/5/2005	164.3	1.057	236,541	250,064.9						
12/6/2005	165.8	1.054	238,731	251,625.5						
12/7/2005	175.9	1.079	253,327	273,276.5						
12/8/2005	165.8	1.075	238,764	256,611.7						
12/9/2005	166.6	1.100	239,912	263,793.6						
12/10/2005	226.8	1.087	326,528	354,886.2						
12/11/2005	223.5	1.089	321,808	350,399.7						
12/12/2005	258.5	1.099	372,256	408,995.8						
12/13/2005	298.7	1.084	430,103	466,305.9						
12/14/2005	299.7	1.089	431,591	470,035.0						
12/15/2005	299.9	1.093	431,895	471,881.3						
12/16/2005	298.5	1.103	429,887	474,165.2						
12/17/2005	299.9	1.092	431,902	471,457.2						
12/18/2005	300.0	1.097	431,931	473,719.5						
12/19/2005	295.1	1.109	424,943	471,132.8						
12/20/2005	278.6	1.099	401,201	441,071.4						
12/21/2005	285.6	1.103	411,242	453,409.6						
12/22/2005	291.5	1.098	419,732	460,693.7						
12/23/2005	282.5	1.091	406,746	443,593.3						
12/24/2005	294.0	1.100	423,418	465,718.2						
12/25/2005	251.3	1.103	361,864	399,308.8						
12/26/2005	200.0	1.102	287,929	317,360.6						
12/27/2005	169.1	1.105	243,482	269,128.0						
12/28/2005	22.9	1.106	33,033	36,527.9						
12/29/2005	261.7	1.110	376,805	418,119.4						
12/30/2005	299.9	1.116	431,908	481,855.0						
12/31/2005	299.6	1.111	431,489	479,253.5	10,134,140	11,091,011	1.094	27,187,719	29,804,790	1.096
1/1/2006	300.0	1.110	432,004	479,438.8						
1/2/2006	260.4	1.110	374,963	416,040.4						
1/3/2006	249.2	1.117	358,824	400,947.2						
1/4/2006	289.9	1.106	417,491	461,574.3						
1/5/2006	281.6	1.069	405,541	433,354.6						
1/6/2006	225.3	1.078	324,393	349,779.5						
1/7/2006	252.7	1.114	363,878	405,287.6						
1/8/2006	265.3	1.081	382,027	412,996.4						
1/9/2006	298.3	1.097	429,510	471,126.9						
1/10/2006	293.3	1.089	422,297	459,881.7						
1/11/2006	278.7	1.077	401,351	432,254.6						
1/12/2006	281.6	1.107	405,506	448,772.3						
1/13/2006	256.4	1.113	369,184	410,775.0						
1/14/2006	280.6	1.115	404,067	450,669.0						
1/15/2006	246.6	1.105	355,158	392,489.2						
1/16/2006	269.8	1.114	388,447	432,797.0						
1/17/2006	218.3	1.111	314,422	349,456.6						
1/18/2006	278.8	1.105	401,543	443,750.0						
1/19/2006	224.3	1.108	323,012	358,036.7						
1/20/2006	295.6	1.109	425,666	471,999.1						
1/21/2006	279.6	1.107	402,653	445,717.9						
1/22/2006	206.6	1.088	297,456	323,758.5						
1/23/2006	194.5	1.113	280,072	311,749.7						
1/24/2006	224.7	1.106	323,501	357,912.0						
1/25/2006	249.6	1.102	359,411	396,054.7						
1/26/2006	282.1	1.108	406,280	450,139.9						
1/27/2006	269.0	1.107	387,357	428,786.6						
1/28/2006	260.8	1.099	375,496	412,613.1						
1/29/2006	261.5	1.105	376,517	415,993.8						
1/30/2006	274.1	1.109	394,672	437,858.6						
1/31/2006	285.9	1.109	411,730	456,633.8	11,714,429	12,918,645	1.103	30,337,151	33,318,701	1.098

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2006	287.6	1.094	414,076	453,068.1						
2/2/2006	290.8	1.096	418,809	458,820.4						
2/3/2006	293.4	1.097	422,527	463,511.7						
2/4/2006	264.2	1.113	380,470	423,502.9						
2/5/2006	271.2	1.113	390,531	434,682.1						
2/6/2006	280.5	1.115	403,971	450,428.2						
2/7/2006	251.1	1.118	361,528	404,320.3						
2/8/2006	175.4	1.117	252,636	282,234.4						
2/9/2006	180.1	1.118	259,395	290,045.0						
2/10/2006	206.4	1.098	297,240	326,331.0						
2/11/2006	222.6	1.106	320,480	354,389.7						
2/12/2006	190.0	1.111	273,638	303,960.0						
2/13/2006	192.9	1.097	277,786	304,705.8						
2/14/2006	225.5	1.087	324,730	352,968.9						
2/15/2006	227.0	1.083	326,897	354,085.8						
2/16/2006	215.1	1.083	309,725	335,370.6						
2/17/2006	182.5	1.071	262,867	281,525.2						
2/18/2006	208.8	1.084	300,662	325,959.1						
2/19/2006	41.4	1.113	59,545	66,248.5						
2/20/2006	99.4	1.080	143,127	154,584.1						
2/21/2006	241.3	1.080	347,407	375,144.0						
2/22/2006	249.2	1.089	358,830	390,714.4						
2/23/2006	110.4	1.086	158,977	172,699.9						
2/24/2006	0.0	1.083	14	14.7						
2/25/2006	95.3	1.083	137,232	148,572.8						
2/26/2006	219.4	1.057	315,868	333,891.4						
2/27/2006	180.6	1.080	260,125	280,893.9						
2/28/2006	22.3	1.084	32,168	34,873.2	7,811,263	8,557,546	1.096	29,659,833	32,567,202	1.098
3/1/2006	57.3	1.085	82,503	89,477.8						
3/2/2006	135.5	1.123	195,186	219,184.6						
3/3/2006	78.3	1.056	112,783	119,106.6						
3/4/2006	188.3	1.068	271,120	289,589.0						
3/5/2006	133.1	1.091	191,616	209,086.4						
3/6/2006	73.3	1.122	105,560	118,450.9						
3/7/2006	63.4	1.121	91,304	102,367.3						
3/8/2006	206.8	1.093	297,801	325,636.7						
3/9/2006	232.1	1.090	334,220	364,209.4						
3/10/2006	259.7	1.097	374,008	410,207.2						
3/11/2006	271.8	1.114	391,360	435,912.8						
3/12/2006	289.5	1.118	416,830	466,016.0						
3/13/2006	294.3	1.125	423,803	476,598.6						
3/14/2006	294.9	1.109	424,628	471,111.9						
3/15/2006	290.9	1.116	418,922	467,456.1						
3/16/2006	299.7	1.107	431,602	477,806.4						
3/17/2006	288.4	1.106	415,339	459,472.4						
3/18/2006	239.4	1.106	344,794	381,449.6						
3/19/2006	296.5	1.109	426,914	473,579.9						
3/20/2006	292.9	1.114	421,747	470,024.7						
3/21/2006	242.2	1.115	348,706	388,859.8						
3/22/2006	199.7	1.116	287,618	320,909.2						
3/23/2006	206.5	1.112	297,375	330,685.6						
3/24/2006	232.7	1.103	335,151	369,605.0						
3/25/2006	265.9	1.106	382,958	423,617.9						
3/26/2006	275.0	1.113	396,009	440,826.5						
3/27/2006	278.6	1.118	401,159	448,649.7						
3/28/2006	298.2	1.121	429,438	481,431.6						
3/29/2006	298.9	1.119	430,441	481,865.9						
3/30/2006	290.4	1.097	418,211	458,586.3						
3/31/2006	256.1	1.096	368,854	404,171.4	10,267,959	11,375,953	1.108	29,793,651	32,852,145	1.103

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2006	284.4	1.099	409,503	450,043.3						
4/2/2006	249.6	1.082	359,447	388,959.9						
4/3/2006	232.8	1.085	335,165	363,796.0						
4/4/2006	278.1	1.094	400,409	437,859.4						
4/5/2006	286.0	1.103	411,906	454,225.7						
4/6/2006	273.8	1.106	394,343	436,125.4						
4/7/2006	288.9	1.111	416,082	462,184.6						
4/8/2006	277.4	1.107	399,517	442,416.1						
4/9/2006	291.1	1.098	419,136	460,347.5						
4/10/2006	285.5	1.098	411,157	451,627.7						
4/11/2006	207.2	1.106	298,424	329,946.2						
4/12/2006	88.4	1.107	127,239	140,816.1						
4/13/2006	223.7	1.105	322,080	355,803.1						
4/14/2006	229.2	1.114	330,003	367,630.7						
4/15/2006	258.2	1.117	371,824	415,335.3						
4/16/2006	293.8	1.121	423,027	474,244.0						
4/17/2006	284.0	1.108	409,030	453,259.9						
4/18/2006	277.9	1.087	400,197	435,122.8						
4/19/2006	270.6	1.094	389,617	426,326.4						
4/20/2006	247.9	1.097	357,027	391,529.2						
4/21/2006	94.9	1.097	136,665	149,944.7						
4/22/2006	153.8	1.114	221,432	246,759.0						
4/23/2006	171.9	1.044	247,516	258,310.4						
4/24/2006	143.5	1.147	206,616	236,925.5						
4/25/2006	205.1	1.128	295,335	333,144.2						
4/26/2006	223.2	1.122	321,415	360,564.3						
4/27/2006	281.9	1.119	405,959	454,442.7						
4/28/2006	292.5	1.091	421,228	459,412.6						
4/29/2006	269.9	1.083	388,703	421,112.8						
4/30/2006	298.4	1.074	429,643	461,435.0	10,459,646	11,519,650	1.101	28,538,868	31,453,150	1.102
5/1/2006	297.2	1.089	428,035	466,067.9						
5/2/2006	293.7	1.107	422,931	468,059.0						
5/3/2006	293.6	1.105	422,742	466,934.4						
5/4/2006	213.9	1.099	308,002	338,401.0						
5/5/2006	260.6	1.096	375,285	411,277.6						
5/6/2006	288.7	1.105	415,723	459,550.7						
5/7/2006	293.8	1.105	423,042	467,641.0						
5/8/2006	287.1	1.111	413,420	459,290.4						
5/9/2006	298.4	1.100	429,640	472,724.2						
5/10/2006	296.9	1.082	427,465	462,661.5						
5/11/2006	296.4	1.077	426,756	459,636.0						
5/12/2006	289.9	1.088	417,444	454,198.1						
5/13/2006	293.1	1.106	422,119	466,821.7						
5/14/2006	196.0	1.101	282,289	310,849.3						
5/15/2006	252.1	1.098	363,050	398,729.9						
5/16/2006	292.7	1.103	421,453	464,821.2						
5/17/2006	298.6	1.084	430,039	466,123.0						
5/18/2006	289.3	1.082	416,570	450,718.4						
5/19/2006	297.0	1.090	427,693	466,100.8						
5/20/2006	243.4	1.088	350,470	381,220.8						
5/21/2006	250.6	1.093	360,911	394,382.8						
5/22/2006	239.6	1.092	344,999	376,778.4						
5/23/2006	154.7	1.095	222,722	243,988.1						
5/24/2006	161.4	1.108	232,484	257,686.3						
5/25/2006	180.0	1.110	259,141	287,703.5						
5/26/2006	267.7	1.093	385,521	421,418.4						
5/27/2006	252.5	1.094	363,547	397,762.0						
5/28/2006	210.2	1.088	302,623	329,320.4						
5/29/2006	290.0	1.100	417,647	459,224.6						
5/30/2006	286.6	1.096	412,753	452,485.1						
5/31/2006	294.1	1.104	423,451	467,536.4	11,749,970	12,880,113	1.096	32,477,575	35,775,716	1.102

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2006	292.6	1.098	421,283	462,759.6						
6/2/2006	295.2	1.089	425,058	462,945.5						
6/3/2006	292.9	1.083	421,795	457,008.4						
6/4/2006	250.6	1.074	360,811	387,436.9						
6/5/2006	26.0	1.089	37,491	40,818.2						
6/6/2006	126.7	1.089	182,465	198,734.2						
6/7/2006	287.5	1.058	414,063	438,040.4						
6/8/2006	295.7	1.064	425,771	453,071.0						
6/9/2006	289.7	1.065	417,139	444,259.1						
6/10/2006	296.4	1.062	426,810	453,321.0						
6/11/2006	288.0	1.066	414,703	441,991.3						
6/12/2006	276.6	1.067	398,365	425,040.4						
6/13/2006	124.5	1.019	179,216	182,709.0						
6/14/2006	6.8	1.019	9,768	9,957.7						
6/15/2006	264.1	1.074	380,268	408,499.4						
6/16/2006	260.5	1.100	375,153	412,554.1						
6/17/2006	257.1	1.089	370,161	403,289.8						
6/18/2006	251.4	1.099	361,960	397,930.7						
6/19/2006	110.1	1.033	158,603	163,780.6						
6/20/2006	246.1	1.033	354,373	365,940.9						
6/21/2006	152.8	1.033	220,066	227,249.6						
6/22/2006	168.1	1.033	242,095	249,997.3						
6/23/2006	207.2	1.033	298,398	308,139.1						
6/24/2006	97.9	1.036	140,917	145,939.7						
6/25/2006	232.8	1.050	335,238	351,951.4						
6/26/2006	190.6	1.056	274,460	289,802.7						
6/27/2006	207.5	1.033	298,840	308,658.6						
6/28/2006	198.5	1.068	285,791	305,094.1						
6/29/2006	294.4	1.079	423,869	457,293.6						
6/30/2006	289.9	1.087	417,505	453,922.7	9,472,437	10,108,137	1.067	31,682,053	34,507,900	1.089
7/1/2006	276.3	1.085	397,840	431,598.7						
7/2/2006	280.8	1.075	404,400	434,542.2						
7/3/2006	207.1	1.067	298,228	318,290.1						
7/4/2006	97.9	1.015	141,043	143,197.3						
7/5/2006	250.0	1.029	360,012	370,304.8						
7/6/2006	249.3	1.039	358,992	372,940.5						
7/7/2006	126.9	1.033	182,675	188,666.6						
7/8/2006	220.9	1.028	318,150	327,096.9						
7/9/2006	90.5	1.058	130,312	137,912.9						
7/10/2006	168.9	1.058	243,216	257,401.6						
7/11/2006	191.5	1.032	275,759	284,515.5						
7/12/2006	110.1	1.065	158,496	168,842.0						
7/13/2006	199.6	1.038	287,485	298,367.7						
7/14/2006	130.6	1.026	188,092	193,063.7						
7/15/2006	146.7	1.019	211,231	215,302.0						
7/16/2006	206.9	1.022	297,963	304,599.0						
7/17/2006	143.3	1.038	206,401	214,310.9						
7/18/2006	219.6	1.036	316,275	327,729.8						
7/19/2006	137.8	1.020	198,385	202,405.6						
7/20/2006	102.3	1.028	147,241	151,364.4						
7/21/2006	238.4	1.043	343,277	357,894.5						
7/22/2006	83.9	1.026	120,768	123,877.3						
7/23/2006	0.0	1.036	14	14.3						
7/24/2006	120.7	1.036	173,786	180,007.0						
7/25/2006	176.1	1.035	253,640	262,561.5						
7/26/2006	241.1	1.042	347,252	361,855.5						
7/27/2006	239.4	1.046	344,742	360,712.5						
7/28/2006	194.4	1.040	279,935	291,015.6						
7/29/2006	0.0	1.031	0	0.0						
7/30/2006	106.3	1.031	153,076	157,839.2						
7/31/2006	232.1	1.035	334,217	346,010.3	7,472,903	7,784,240	1.042	28,695,311	30,772,490	1.072

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2006	162.7	1.028	234,312	240,838.9						
8/2/2006	224.9	1.023	323,905	331,457.7						
8/3/2006	215.2	1.016	309,841	314,784.2						
8/4/2006	208.1	1.038	299,673	311,094.6						
8/5/2006	201.6	1.049	290,257	304,543.7						
8/6/2006	200.3	1.056	288,428	304,475.0						
8/7/2006	129.5	1.050	186,442	195,794.9						
8/8/2006	246.9	1.050	355,464	373,334.1						
8/9/2006	236.6	1.021	340,752	347,749.6						
8/10/2006	154.0	1.057	221,728	234,299.1						
8/11/2006	92.4	1.060	133,026	141,022.6						
8/12/2006	198.0	1.061	285,129	302,629.2						
8/13/2006	107.2	1.060	154,315	163,632.1						
8/14/2006	141.3	1.066	203,422	216,753.8						
8/15/2006	197.1	1.050	283,757	298,022.0						
8/16/2006	186.0	1.047	267,891	280,611.1						
8/17/2006	0.0	1.067	14	14.4						
8/18/2006	0.0	1.067	14	14.4						
8/19/2006	26.9	1.066	38,726	41,298.4						
8/20/2006	256.6	1.078	369,517	398,498.6						
8/21/2006	215.1	1.047	309,774	324,485.5						
8/22/2006	219.0	1.064	315,367	335,473.1						
8/23/2006	220.0	1.058	316,753	335,093.7						
8/24/2006	156.7	1.086	225,642	245,084.4						
8/25/2006	205.4	1.071	295,751	316,644.1						
8/26/2006	215.0	1.068	309,604	330,692.4						
8/27/2006	204.9	1.064	294,998	313,988.9						
8/28/2006	219.9	1.049	316,604	331,971.2						
8/29/2006	30.8	1.061	44,297	47,013.4						
8/30/2006	192.4	1.065	277,051	295,031.6						
8/31/2006	194.3	1.068	279,724	298,717.8	7,572,176	7,975,065	1.053	24,517,517	25,867,442	1.055
9/1/2006	80.6	1.070	116,107	124,247.8						
9/2/2006	206.6	1.079	297,561	321,148.8						
9/3/2006	80.9	1.095	116,495	127,507.8						
9/4/2006	22.4	1.063	32,192	34,208.6						
9/5/2006	136.6	1.063	196,642	208,960.6						
9/6/2006	195.7	1.142	281,786	321,741.9						
9/7/2006	190.4	1.071	274,133	293,526.0						
9/8/2006	79.0	1.079	113,690	122,641.7						
9/9/2006	174.3	1.081	250,940	271,255.0						
9/10/2006	95.3	1.096	137,272	150,410.4						
9/11/2006	134.0	1.095	192,981	211,336.1						
9/12/2006	209.3	1.103	301,440	332,349.0						
9/13/2006	106.4	1.084	153,208	166,037.7						
9/14/2006	0.0	1.084	14	14.7						
9/15/2006	178.4	1.086	256,931	279,083.3						
9/16/2006	241.1	1.108	347,239	384,598.8						
9/17/2006	197.8	1.094	284,767	311,433.3						
9/18/2006	194.7	1.072	280,323	300,434.1						
9/19/2006	88.8	1.088	127,813	139,027.4						
9/20/2006	200.8	1.085	289,097	313,626.4						
9/21/2006	195.7	1.082	281,773	304,941.7						
9/22/2006	70.7	1.051	101,848	107,047.9						
9/23/2006	201.6	1.080	290,318	313,485.8						
9/24/2006	67.3	1.053	96,898	102,019.1						
9/25/2006	0.0	1.056	14	14.3						
9/26/2006	17.9	1.051	25,722	27,035.7						
9/27/2006	24.2	1.050	34,812	36,555.1						
9/28/2006	80.5	1.057	115,881	122,493.1						
9/29/2006	162.4	1.053	233,922	246,334.0						
9/30/2006	47.6	1.039	68,606	71,250.2	5,300,425	5,744,766	1.084	20,345,505	21,504,071	1.057

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2006	0.0	1.047	14	14.2						
10/2/2006	75.4	1.048	108,602	113,814.9						
10/3/2006	172.3	1.074	248,113	266,473.3						
10/4/2006	173.2	1.079	249,384	269,085.2						
10/5/2006	91.9	1.087	132,332	143,844.8						
10/6/2006	178.2	1.088	256,542	279,117.3						
10/7/2006	66.8	1.086	96,152	104,421.4						
10/8/2006	88.4	1.071	127,280	136,316.9						
10/9/2006	213.3	1.065	307,216	327,185.5						
10/10/2006	111.9	1.065	161,200	171,677.6						
10/11/2006	216.7	1.058	312,007	330,103.7						
10/12/2006	124.7	1.055	179,602	189,480.3						
10/13/2006	161.5	1.036	232,571	240,943.3						
10/14/2006	157.9	1.041	227,443	236,768.6						
10/15/2006	216.6	1.042	311,974	325,077.1						
10/16/2006	0.0	1.011	14	13.7						
10/17/2006	176.1	1.025	253,560	259,899.2						
10/18/2006	214.9	1.055	309,454	326,474.1						
10/19/2006	196.3	1.082	282,634	305,810.4						
10/20/2006	126.7	1.045	182,506	190,719.0						
10/21/2006	213.7	1.061	307,751	326,524.2						
10/22/2006	0.0	1.088	323,980	352,490.4						
10/23/2006	0.0	1.040	355,040	369,241.7						
10/24/2006	247.3	1.027	356,147	365,762.7						
10/25/2006	241.7	1.054	348,039	366,833.1						
10/26/2006	231.7	1.050	333,654	350,336.9						
10/27/2006	0.0	1.054	368,642	388,548.4						
10/28/2006	0.0	1.064	338,968	360,662.0						
10/29/2006	145.7	1.067	209,876	223,937.9						
10/30/2006	243.2	1.067	350,139	373,598.3						
10/31/2006	242.9	1.036	349,806	362,399.1	7,620,643	8,057,575	1.057	20,493,244	21,777,406	1.063
11/1/2006	255.5	1.029	367,872	378,540.1						
11/2/2006	106.7	1.056	153,658	162,263.3						
11/3/2006	199.5	1.061	287,328	304,855.4						
11/4/2006	178.0	1.040	256,319	266,571.3						
11/5/2006	183.0	1.065	263,572	280,704.0						
11/6/2006	181.5	1.055	261,406	275,783.7						
11/7/2006	183.0	1.061	263,518	279,592.8						
11/8/2006	182.5	1.053	262,757	276,683.3						
11/9/2006	226.0	1.046	325,436	340,406.6						
11/10/2006	240.0	1.058	345,533	365,573.6						
11/11/2006	237.6	1.060	342,214	362,747.3						
11/12/2006	240.5	1.027	346,355	355,706.3						
11/13/2006	95.4	1.035	137,331	142,137.7						
11/14/2006	101.4	1.034	146,020	150,984.5						
11/15/2006	20.1	1.040	28,965	30,123.2						
11/16/2006	158.7	1.047	228,594	239,337.5						
11/17/2006	194.5	1.056	280,046	295,728.8						
11/18/2006	107.8	1.057	155,253	164,102.3						
11/19/2006	51.8	1.055	74,632	78,736.7						
11/20/2006	165.6	1.059	238,494	252,565.5						
11/21/2006	185.0	1.063	266,406	283,190.0						
11/22/2006	185.0	1.074	266,448	286,165.6						
11/23/2006	188.0	1.080	270,650	292,301.7						
11/24/2006	209.2	1.076	301,198	324,089.1						
11/25/2006	206.8	1.076	297,750	320,379.4						
11/26/2006	91.9	1.070	132,264	141,522.5						
11/27/2006	193.4	1.071	278,491	298,264.4						
11/28/2006	245.3	1.067	353,197	376,861.0						
11/29/2006	114.5	1.064	164,825	175,374.2						
11/30/2006	165.2	1.050	237,828	249,719.0	7,334,362	7,751,011	1.057	20,255,430	21,553,352	1.064

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2006	91.2	1.050	131,275	137,838.5						
12/2/2006	180.0	1.050	259,165	272,123.6						
12/3/2006	82.8	1.050	119,179	125,137.5						
12/4/2006	72.0	1.041	103,680	107,981.5						
12/5/2006	154.8	1.044	222,966	232,886.5						
12/6/2006	126.5	1.033	182,230	188,312.2						
12/7/2006	121.8	1.047	175,390	183,598.6						
12/8/2006	168.9	1.067	243,214	259,575.7						
12/9/2006	130.2	1.050	187,478	196,824.2						
12/10/2006	187.2	1.052	269,499	283,628.9						
12/11/2006	219.2	1.060	315,576	334,581.9						
12/12/2006	183.7	1.040	264,509	274,965.0						
12/13/2006	183.7	1.069	264,558	282,924.2						
12/14/2006	151.5	1.069	218,182	233,168.6						
12/15/2006	154.1	1.056	221,947	234,471.4						
12/16/2006	155.3	1.005	223,693	224,884.1						
12/17/2006	122.2	1.005	175,925	176,861.4						
12/18/2006	0.0	1.005	14	13.6						
12/19/2006	4.6	1.005	6,672	6,707.7						
12/20/2006	138.1	1.010	198,933	200,911.8						
12/21/2006	133.4	1.009	192,066	193,826.8						
12/22/2006	120.9	1.006	174,039	175,167.3						
12/23/2006	46.5	1.005	66,975	67,306.8						
12/24/2006	75.7	1.012	108,937	110,271.9						
12/25/2006	147.3	1.028	212,172	218,159.4						
12/26/2006	67.3	1.034	96,852	100,172.3						
12/27/2006	79.7	1.035	114,714	118,773.9						
12/28/2006	142.2	1.038	204,789	212,601.0						
12/29/2006	153.9	1.021	221,593	226,338.3						
12/30/2006	77.5	1.033	111,585	115,268.1						
12/31/2006	169.4	1.036	244,004	252,776.9	5,531,809	5,748,060	1.039	20,486,814	21,556,646	1.052
1/1/2007	122.4	1.020	176,251	179,714.1						
1/2/2007	150.1	1.023	216,144	221,016.8						
1/3/2007	173.1	1.018	249,293	253,666.7						
1/4/2007	182.8	1.020	263,200	268,589.5						
1/5/2007	182.1	1.042	262,185	273,266.1						
1/6/2007	187.1	1.049	269,395	282,726.0						
1/7/2007	156.7	1.042	225,651	235,225.2						
1/8/2007	140.0	1.008	201,537	203,130.9						
1/9/2007	39.2	1.009	56,423	56,925.5						
1/10/2007	0.0	1.008	14	13.6						
1/11/2007	146.2	1.019	210,511	214,613.1						
1/12/2007	151.6	1.020	218,238	222,645.7						
1/13/2007	145.1	1.034	208,946	216,128.7						
1/14/2007	144.8	1.005	208,479	209,622.6						
1/15/2007	147.8	1.008	212,794	214,423.0						
1/16/2007	114.3	1.005	164,655	165,428.1						
1/17/2007	71.4	1.006	102,748	103,332.9						
1/18/2007	151.5	1.024	218,135	223,370.0						
1/19/2007	203.3	1.016	292,785	297,576.1						
1/20/2007	86.8	1.023	125,050	127,971.6						
1/21/2007	100.3	1.027	144,426	148,378.3						
1/22/2007	6.4	1.024	9,229	9,446.9						
1/23/2007	21.5	1.019	30,972	31,572.1						
1/24/2007	59.8	1.025	86,077	88,252.0						
1/25/2007	146.9	1.182	211,605	250,075.4						
1/26/2007	145.0	1.005	208,791	209,936.3						
1/27/2007	169.5	1.006	244,011	245,387.5						
1/28/2007	186.3	1.004	268,327	269,514.0						
1/29/2007	82.2	1.013	118,385	119,962.1						
1/30/2007	128.0	1.026	184,320	189,131.6						
1/31/2007	149.9	1.048	215,840	226,132.1	5,604,417	5,757,174	1.027	18,470,587	19,256,245	1.043

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2007	57.8	1.040	83,258	86,610.7						
2/2/2007	143.7	1.025	206,934	212,029.1						
2/3/2007	150.3	1.042	216,483	225,677.5						
2/4/2007	150.4	1.057	216,555	228,819.6						
2/5/2007	58.3	1.049	83,928	88,059.4						
2/6/2007	144.8	1.036	208,467	216,031.2						
2/7/2007	149.6	1.028	215,437	221,416.5						
2/8/2007	146.7	1.029	211,227	217,267.2						
2/9/2007	80.4	1.026	115,807	118,807.0						
2/10/2007	154.5	1.027	222,506	228,540.8						
2/11/2007	153.6	1.028	221,132	227,303.7						
2/12/2007	151.5	1.039	218,214	226,660.0						
2/13/2007	158.2	1.034	227,736	235,577.7						
2/14/2007	155.1	1.056	223,333	235,742.2						
2/15/2007	154.9	1.038	223,033	231,410.9						
2/16/2007	155.1	1.047	223,327	233,840.2						
2/17/2007	145.6	1.045	209,661	219,078.1						
2/18/2007	55.8	1.042	80,346	83,718.0						
2/19/2007	177.7	1.039	255,926	265,790.1						
2/20/2007	180.6	1.038	260,037	269,869.4						
2/21/2007	86.5	1.032	124,544	128,575.2						
2/22/2007	79.9	1.045	114,986	120,184.7						
2/23/2007	154.3	1.012	222,264	224,824.7						
2/24/2007	105.1	1.027	151,360	155,439.5						
2/25/2007	98.6	1.033	141,920	146,550.2						
2/26/2007	165.2	1.033	237,862	245,662.5						
2/27/2007	164.0	1.010	236,205	238,593.8						
2/28/2007	169.3	1.008	243,763	245,779.8	5,396,252	5,577,860	1.034	16,532,477	17,083,094	1.033
3/1/2007	180.2	1.045	259,417	271,216.4						
3/2/2007	180.0	1.038	259,196	269,115.6						
3/3/2007	171.2	1.034	246,550	255,040.8						
3/4/2007	161.7	1.044	232,852	243,199.3						
3/5/2007	180.3	1.043	259,681	270,890.7						
3/6/2007	178.3	1.051	256,749	269,749.9						
3/7/2007	186.5	1.041	268,583	279,526.0						
3/8/2007	188.5	1.053	271,460	285,779.3						
3/9/2007	180.0	1.052	259,228	272,829.4						
3/10/2007	179.0	1.054	257,702	271,738.7						
3/11/2007	159.5	1.044	229,709	239,899.5						
3/12/2007	166.9	1.053	240,362	253,203.0						
3/13/2007	177.1	1.053	255,011	268,635.2						
3/14/2007	149.9	1.039	215,863	224,191.9						
3/15/2007	0.0	1.037	14	14.0						
3/16/2007	22.9	1.033	32,994	34,069.4						
3/17/2007	99.2	1.027	142,869	146,788.3						
3/18/2007	65.6	1.023	94,398	96,530.8						
3/19/2007	180.0	1.029	259,254	266,706.9						
3/20/2007	176.3	1.054	253,938	267,718.3						
3/21/2007	171.3	1.047	246,722	258,383.6						
3/22/2007	149.3	1.048	214,994	225,358.9						
3/23/2007	67.5	1.049	97,202	101,995.3						
3/24/2007	155.6	1.050	224,093	235,403.4						
3/25/2007	171.0	1.047	246,289	257,979.9						
3/26/2007	168.4	1.050	242,560	254,675.4						
3/27/2007	75.1	1.051	108,101	113,614.4						
3/28/2007	171.3	1.049	246,744	258,914.3						
3/29/2007	172.6	1.054	248,490	261,818.4						
3/30/2007	175.0	1.049	252,026	264,389.0						
3/31/2007	174.9	1.046	251,838	263,502.2	6,674,889	6,982,878	1.046	17,675,557	18,317,912	1.036

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2007	127.4	1.044	183,525	191,658.7						
4/2/2007	161.1	1.043	232,043	241,960.8						
4/3/2007	185.8	1.044	267,589	279,463.8						
4/4/2007	122.3	1.032	176,109	181,819.2						
4/5/2007	0.0	1.035	14	14.0						
4/6/2007	0.0	1.034	14	14.0						
4/7/2007	0.0	1.034	14	14.0						
4/8/2007	13.5	1.033	19,470	20,118.9						
4/9/2007	0.0	1.035	14	14.0						
4/10/2007	128.5	1.028	184,994	190,185.3						
4/11/2007	91.5	1.040	131,733	136,954.5						
4/12/2007	157.5	1.035	226,796	234,829.7						
4/13/2007	150.7	1.033	217,049	224,316.5						
4/14/2007	87.9	1.033	126,618	130,857.6						
4/15/2007	99.2	1.029	142,881	147,070.4						
4/16/2007	96.8	1.036	139,457	144,500.9						
4/17/2007	150.1	1.043	216,150	225,388.6						
4/18/2007	149.3	1.051	214,933	225,850.7						
4/19/2007	154.8	1.036	222,938	230,883.1						
4/20/2007	160.0	1.047	230,401	241,255.5						
4/21/2007	158.9	1.049	228,817	240,030.4						
4/22/2007	31.5	1.040	45,368	47,182.7						
4/23/2007	87.4	1.039	125,792	130,646.1						
4/24/2007	89.7	1.048	129,185	135,394.2						
4/25/2007	62.5	1.040	90,064	93,648.6						
4/26/2007	100.2	1.041	144,278	150,254.5						
4/27/2007	0.0	1.046	14	14.1						
4/28/2007	93.0	1.051	133,909	140,782.3						
4/29/2007	104.6	1.056	150,604	159,078.5						
4/30/2007	35.0	1.057	50,385	53,242.0	4,031,156	4,197,444	1.041	16,102,297	16,758,181	1.041
5/1/2007	186.1	1.053	267,989	282,235.2						
5/2/2007	40.4	1.055	58,215	61,429.4						
5/3/2007	106.4	1.057	153,216	161,893.2						
5/4/2007	73.4	1.045	105,668	110,402.0						
5/5/2007	56.3	1.040	81,019	84,252.5						
5/6/2007	17.3	1.028	24,964	25,661.1						
5/7/2007	157.6	1.026	226,890	232,792.6						
5/8/2007	177.1	1.036	254,995	264,164.9						
5/9/2007	196.7	1.022	283,221	289,541.5						
5/10/2007	141.5	1.019	203,804	207,741.4						
5/11/2007	198.9	1.036	286,440	296,634.2						
5/12/2007	183.7	1.019	264,485	269,441.8						
5/13/2007	149.9	1.004	215,831	216,639.0						
5/14/2007	210.0	1.041	302,353	314,802.8						
5/15/2007	130.7	1.027	188,214	193,297.2						
5/16/2007	159.9	1.050	230,234	241,722.4						
5/17/2007	183.1	1.046	263,595	275,762.1						
5/18/2007	186.7	1.036	268,859	278,552.0						
5/19/2007	185.2	1.027	266,734	273,981.5						
5/20/2007	180.9	1.022	260,465	266,189.2						
5/21/2007	128.1	1.029	184,512	189,854.2						
5/22/2007	170.0	1.036	244,770	253,519.1						
5/23/2007	38.9	1.020	55,984	57,078.0						
5/24/2007	173.6	1.025	250,028	256,163.3						
5/25/2007	177.7	1.027	255,919	262,856.4						
5/26/2007	98.0	1.032	141,076	145,604.9						
5/27/2007	201.8	1.034	290,538	300,446.7						
5/28/2007	139.3	1.019	200,643	204,489.7						
5/29/2007	199.4	1.031	287,155	296,064.4						
5/30/2007	101.7	1.011	146,513	148,157.8						
5/31/2007	59.0	1.008	84,974	85,662.7	6,349,303	6,547,033	1.031	17,055,348	17,727,355	1.039

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2007	124.8	1.025	179,666	184,236.5						
6/2/2007	106.7	1.030	153,583	158,119.2						
6/3/2007	160.4	1.162	230,984	268,308.9						
6/4/2007	117.3	1.020	168,889	172,197.6						
6/5/2007	146.2	1.182	210,598	248,862.8						
6/6/2007	177.7	1.182	255,867	302,356.8						
6/7/2007	92.6	1.015	133,333	135,307.7						
6/8/2007	157.8	1.005	227,183	228,227.7						
6/9/2007	109.2	1.003	157,248	157,661.1						
6/10/2007	1.4	1.004	2,031	2,039.1						
6/11/2007	0.0	1.004	14	13.6						
6/12/2007	70.1	1.004	100,993	101,387.6						
6/13/2007	113.8	1.020	163,868	167,139.5						
6/14/2007	77.5	1.021	111,631	113,970.4						
6/15/2007	151.4	1.013	218,061	220,795.2						
6/16/2007	151.7	1.009	218,505	220,370.4						
6/17/2007	1.5	1.007	2,117	2,131.2						
6/18/2007	0.0	1.009	14	13.7						
6/19/2007	141.8	1.024	204,239	209,093.9						
6/20/2007	186.3	1.020	268,334	273,806.3						
6/21/2007	181.3	1.021	261,009	266,616.6						
6/22/2007	189.8	1.032	273,301	282,120.6						
6/23/2007	191.0	1.035	275,009	284,751.2						
6/24/2007	171.8	1.043	247,410	257,984.7						
6/25/2007	156.4	1.043	225,279	235,015.8						
6/26/2007	158.9	1.026	228,791	234,777.4						
6/27/2007	160.0	1.005	230,375	231,455.0						
6/28/2007	154.7	1.008	222,811	224,678.1						
6/29/2007	176.1	1.017	253,646	258,025.6						
6/30/2007	170.4	1.021	245,410	250,642.0	5,470,201	5,692,106	1.041	15,850,660	16,436,583	1.037
7/1/2007	172.0	1.034	247,619	256,116.9						
7/2/2007	168.9	1.044	243,147	253,808.7						
7/3/2007	166.7	1.039	240,092	249,406.7						
7/4/2007	160.5	1.041	231,134	240,562.8						
7/5/2007	171.5	1.033	246,984	255,096.5						
7/6/2007	173.8	1.010	250,296	252,789.4						
7/7/2007	157.5	1.002	226,837	227,376.9						
7/8/2007	163.3	1.003	235,080	235,874.3						
7/9/2007	163.8	1.029	235,819	242,758.9						
7/10/2007	113.4	1.004	163,264	163,995.7						
7/11/2007	77.5	1.051	111,586	117,331.3						
7/12/2007	63.1	1.048	90,852	95,256.4						
7/13/2007	91.2	1.046	131,389	137,489.4						
7/14/2007	61.7	1.027	88,824	91,200.3						
7/15/2007	168.7	1.027	242,864	249,360.1						
7/16/2007	178.4	1.029	256,849	264,299.7						
7/17/2007	181.0	1.029	260,606	268,111.8						
7/18/2007	181.0	1.029	260,574	268,051.8						
7/19/2007	131.0	1.034	188,651	195,047.4						
7/20/2007	136.2	1.018	196,089	199,600.2						
7/21/2007	133.8	1.013	192,676	195,173.2						
7/22/2007	57.8	1.004	83,279	83,604.4						
7/23/2007	22.7	1.023	32,738	33,493.4						
7/24/2007	131.0	1.025	188,677	193,454.3						
7/25/2007	42.5	1.052	61,237	64,392.3						
7/26/2007	64.8	1.055	93,304	98,442.4						
7/27/2007	144.9	1.054	208,604	219,848.7						
7/28/2007	65.6	1.019	94,404	96,243.7						
7/29/2007	153.3	1.020	220,810	225,332.6						
7/30/2007	152.8	1.020	220,102	224,610.6						
7/31/2007	152.9	1.019	220,147	224,412.7	5,764,534	5,922,543	1.027	17,584,038	18,161,682	1.033

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2007	37.1	1.019	53,397	54,437.1						
8/2/2007	0.0	1.019	14	13.8						
8/3/2007	38.1	1.009	54,794	55,267.7						
8/4/2007	189.4	1.037	272,701	282,814.6						
8/5/2007	154.4	1.043	222,343	231,998.5						
8/6/2007	117.3	1.045	168,937	176,557.8						
8/7/2007	168.4	1.052	242,568	255,208.6						
8/8/2007	9.9	1.100	14,290	15,720.8						
8/9/2007	0.0	1.107	14	15.0						
8/10/2007	0.0	1.107	14	15.0						
8/11/2007	40.3	1.094	57,971	63,443.6						
8/12/2007	36.0	1.094	51,834	56,722.9						
8/13/2007	156.4	1.041	225,165	234,442.1						
8/14/2007	145.9	1.023	210,143	215,033.3						
8/15/2007	85.8	1.042	123,501	128,630.7						
8/16/2007	76.1	1.402	109,653	153,682.9						
8/17/2007	149.1	1.006	214,646	216,037.6						
8/18/2007	115.1	1.006	165,769	166,843.7						
8/19/2007	134.0	1.020	193,014	196,788.8						
8/20/2007	59.6	1.024	85,853	87,873.3						
8/21/2007	149.6	1.027	215,372	221,282.6						
8/22/2007	190.1	1.024	273,756	280,460.2						
8/23/2007	187.1	1.023	269,411	275,638.0						
8/24/2007	159.5	1.030	229,736	236,690.8						
8/25/2007	156.3	1.034	225,117	232,820.7						
8/26/2007	27.8	1.019	40,072	40,846.5						
8/27/2007	162.6	1.027	234,162	240,535.9						
8/28/2007	189.4	1.029	272,710	280,577.6						
8/29/2007	169.5	1.023	244,140	249,821.6						
8/30/2007	163.5	1.026	235,387	241,581.7						
8/31/2007	167.4	1.038	241,076	250,149.2	4,947,557	5,141,953	1.039	16,182,293	16,756,602	1.035
9/1/2007	113.6	1.040	163,573	170,047.9						
9/2/2007	110.2	1.026	158,676	162,735.6						
9/3/2007	171.1	1.151	246,329	283,617.8						
9/4/2007	81.5	1.016	117,371	119,293.2						
9/5/2007	71.6	1.019	103,138	105,131.1						
9/6/2007	159.8	1.023	230,174	235,554.8						
9/7/2007	159.8	1.013	230,058	233,025.5						
9/8/2007	178.7	1.014	257,350	261,050.5						
9/9/2007	135.8	1.046	195,556	204,504.9						
9/10/2007	82.5	1.022	118,773	121,419.9						
9/11/2007	53.9	1.076	77,653	83,559.3						
9/12/2007	158.8	1.042	228,735	238,232.2						
9/13/2007	112.8	1.023	162,440	166,210.9						
9/14/2007	31.8	1.020	45,800	46,727.8						
9/15/2007	166.2	1.018	239,357	243,728.5						
9/16/2007	123.5	1.029	177,802	182,881.4						
9/17/2007	153.0	1.026	220,286	225,982.0						
9/18/2007	150.0	1.022	216,036	220,690.7						
9/19/2007	150.0	1.027	215,992	221,751.8						
9/20/2007	155.7	1.033	224,216	231,527.6						
9/21/2007	206.3	1.035	297,122	307,521.0						
9/22/2007	99.7	1.036	143,594	148,696.0						
9/23/2007	164.2	1.045	236,472	247,027.0						
9/24/2007	128.7	1.035	185,278	191,695.3						
9/25/2007	179.1	1.045	257,875	269,399.5						
9/26/2007	135.6	1.061	195,291	207,296.7						
9/27/2007	174.8	1.053	251,753	265,216.4						
9/28/2007	0.0	1.053	14	14.2						
9/29/2007	0.0	1.044	14	14.1						
9/30/2007	0.0	1.044	14	14.1	5,196,743	5,394,568	1.038	15,908,834	16,459,064	1.035

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2007	75.6	1.046	108,910	113,922.0						
10/2/2007	158.3	1.012	227,979	230,822.2						
10/3/2007	174.8	1.011	251,703	254,419.7						
10/4/2007	180.7	1.028	260,253	267,487.2						
10/5/2007	153.5	1.027	221,041	226,952.4						
10/6/2007	150.1	1.025	216,081	221,449.9						
10/7/2007	149.2	1.026	214,788	220,339.9						
10/8/2007	75.3	1.025	108,362	111,048.8						
10/9/2007	147.8	1.027	212,837	218,675.2						
10/10/2007	167.4	1.039	241,061	250,490.0						
10/11/2007	111.0	1.038	159,872	166,007.2						
10/12/2007	161.3	1.027	232,223	238,507.3						
10/13/2007	152.0	1.031	218,824	225,620.7						
10/14/2007	145.5	1.041	209,495	218,043.8						
10/15/2007	153.5	1.033	221,007	228,254.8						
10/16/2007	67.6	1.029	97,352	100,170.9						
10/17/2007	156.1	1.042	224,780	234,138.6						
10/18/2007	175.7	1.033	253,069	261,382.0						
10/19/2007	96.6	1.057	139,085	147,000.3						
10/20/2007	2.0	1.031	2,831	2,919.5						
10/21/2007	151.4	1.035	217,958	225,609.8						
10/22/2007	0.0	1.034	221,576	229,154.6						
10/23/2007	0.0	1.034	223,233	230,741.7						
10/24/2007	155.1	1.049	223,326	234,375.0						
10/25/2007	163.7	1.034	235,696	243,808.4						
10/26/2007	166.5	1.037	239,714	248,485.3						
10/27/2007	0.0	1.035	223,265	231,093.0						
10/28/2007	0.0	1.035	221,854	229,609.1						
10/29/2007	90.5	1.039	130,282	135,357.4						
10/30/2007	27.7	1.039	39,873	41,428.8						
10/31/2007	134.4	1.033	193,540	199,856.4	5,991,872	6,187,172	1.033	16,136,171	16,723,692	1.036
11/1/2007	150.9	1.037	217,310	225,305.9						
11/2/2007	163.6	1.033	235,572	243,385.5						
11/3/2007	142.7	1.045	205,470	214,664.6						
11/4/2007	141.0	1.034	203,096	210,005.3						
11/5/2007	60.4	1.037	86,967	90,168.9						
11/6/2007	22.1	1.035	31,855	32,956.6						
11/7/2007	18.2	1.034	26,159	27,037.7						
11/8/2007	48.7	1.034	70,085	72,454.2						
11/9/2007	149.1	1.037	214,682	222,571.0						
11/10/2007	152.0	1.057	218,900	231,308.9						
11/11/2007	160.0	1.058	230,456	243,763.0						
11/12/2007	148.1	1.032	213,210	219,933.8						
11/13/2007	146.2	1.032	210,566	217,218.1						
11/14/2007	144.9	1.037	208,691	216,360.2						
11/15/2007	131.5	1.043	189,322	197,405.3						
11/16/2007	120.0	1.054	172,737	181,994.4						
11/17/2007	81.5	1.053	117,305	123,474.0						
11/18/2007	69.6	1.053	100,248	105,567.7						
11/19/2007	38.6	1.052	55,613	58,482.0						
11/20/2007	146.0	1.048	210,306	220,314.1						
11/21/2007	176.0	1.042	253,416	264,182.3						
11/22/2007	149.1	1.043	214,696	224,031.7						
11/23/2007	153.1	1.043	220,416	229,792.3						
11/24/2007	62.5	1.037	90,005	93,364.3						
11/25/2007	85.8	1.037	123,504	128,120.8						
11/26/2007	99.1	1.046	142,645	149,145.9						
11/27/2007	150.7	1.034	216,982	224,267.8						
11/28/2007	53.5	1.022	77,024	78,694.5						
11/29/2007	123.1	1.039	177,294	184,256.7						
11/30/2007	107.3	1.041	154,568	160,947.1	4,889,100	5,091,174	1.041	16,077,714	16,672,914	1.037

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2007	60.7	1.041	87,414	91,035.4						
12/2/2007	28.2	1.041	40,584	42,264.2						
12/3/2007	95.4	1.047	137,382	143,875.7						
12/4/2007	157.6	1.059	226,942	240,414.5						
12/5/2007	160.1	1.057	230,524	243,604.5						
12/6/2007	115.6	1.067	166,449	177,533.2						
12/7/2007	108.9	1.033	156,758	162,007.0						
12/8/2007	113.7	1.241	163,669	203,191.9						
12/9/2007	102.4	1.045	147,460	154,166.7						
12/10/2007	152.8	1.067	220,033	234,697.1						
12/11/2007	113.2	1.057	163,035	172,287.7						
12/12/2007	130.5	1.062	187,953	199,560.5						
12/13/2007	144.2	1.073	207,713	222,805.2						
12/14/2007	143.5	1.062	206,629	219,377.6						
12/15/2007	147.1	1.081	211,771	228,915.2						
12/16/2007	153.6	1.083	221,114	239,456.2						
12/17/2007	134.5	1.082	193,707	209,582.2						
12/18/2007	60.0	1.073	86,362	92,644.9						
12/19/2007	155.0	1.073	223,246	239,559.9						
12/20/2007	153.0	1.078	220,370	237,512.2						
12/21/2007	144.1	1.026	207,499	212,830.6						
12/22/2007	131.1	1.024	188,826	193,439.6						
12/23/2007	114.4	1.071	164,722	176,392.1						
12/24/2007	86.3	1.074	124,272	133,508.2						
12/25/2007	95.8	1.062	137,973	146,563.7						
12/26/2007	133.8	1.062	192,663	204,659.1						
12/27/2007	132.7	1.061	191,069	202,663.4						
12/28/2007	40.8	1.058	58,687	62,072.0						
12/29/2007	107.3	1.043	154,480	161,059.0						
12/30/2007	151.8	1.037	218,630	226,756.9						
12/31/2007	152.1	1.033	219,056	226,392.0	5,356,993	5,700,828	1.064	16,237,965	16,979,175	1.046
1/1/2008	150.2	1.042	216,289	225,441.8						
1/2/2008	4.9	1.047	7,070	7,398.7						
1/3/2008	0.0	1.049	0	0.0						
1/4/2008	0.0	1.048	0	0.0						
1/5/2008	0.0	1.047	0	0.0						
1/6/2008	81.3	1.047	117,058	122,590.4						
1/7/2008	161.9	1.055	233,206	246,094.6						
1/8/2008	157.4	1.047	226,587	237,165.8						
1/9/2008	150.0	1.061	216,054	229,281.1						
1/10/2008	65.1	1.030	93,772	96,605.6						
1/11/2008	148.6	1.049	213,992	224,501.8						
1/12/2008	150.0	1.057	216,040	228,356.2						
1/13/2008	114.5	1.060	164,896	174,782.6						
1/14/2008	149.9	1.067	215,923	230,357.5						
1/15/2008	114.0	1.067	164,171	175,162.5						
1/16/2008	31.6	1.048	45,498	47,668.6						
1/17/2008	142.9	1.048	205,816	215,632.5						
1/18/2008	126.4	1.035	181,997	188,366.7						
1/19/2008	130.1	1.061	187,333	198,828.6						
1/20/2008	150.4	1.062	216,555	230,037.0						
1/21/2008	91.2	1.042	131,341	136,885.1						
1/22/2008	83.0	1.040	119,553	124,298.4						
1/23/2008	157.0	1.044	226,013	236,067.4						
1/24/2008	155.0	1.042	223,200	232,502.9						
1/25/2008	510.2	1.040	734,750	763,862.1						
1/26/2008	81.4	1.032	117,226	120,922.0						
1/27/2008	147.6	1.030	212,553	219,019.8						
1/28/2008	150.0	1.031	216,032	222,743.7						
1/29/2008	112.3	1.047	161,755	169,350.5						
1/30/2008	136.0	1.041	195,892	204,017.4						
1/31/2008	134.6	1.038	193,866	201,212.4	5,454,439	5,709,154	1.047	15,700,532	16,501,157	1.051

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2008	154.9	1.035	223,076	230,883.9						
2/2/2008	88.8	1.042	127,910	133,289.5						
2/3/2008	150.1	1.047	216,083	226,229.5						
2/4/2008	142.4	1.046	205,075	214,499.5						
2/5/2008	142.2	1.049	204,719	214,775.1						
2/6/2008	150.0	1.036	216,006	223,851.1						
2/7/2008	54.9	1.033	79,031	81,623.1						
2/8/2008	154.3	1.055	222,142	234,349.4						
2/9/2008	91.4	1.045	131,571	137,437.5						
2/10/2008	154.2	1.041	222,083	231,213.3						
2/11/2008	150.1	1.044	216,093	225,623.7						
2/12/2008	136.4	1.054	196,378	206,912.0						
2/13/2008	150.0	1.047	215,945	226,050.2						
2/14/2008	69.0	1.037	99,304	102,989.5						
2/15/2008	88.9	1.038	128,008	132,852.3						
2/16/2008	153.4	1.039	220,900	229,552.1						
2/17/2008	150.2	1.047	216,232	226,465.6						
2/18/2008	66.5	1.047	95,744	100,263.8						
2/19/2008	150.0	1.046	216,058	226,052.6						
2/20/2008	150.0	1.046	216,027	226,069.2						
2/21/2008	119.9	1.045	172,624	180,356.2						
2/22/2008	146.2	1.045	210,531	219,929.9						
2/23/2008	150.0	1.044	216,041	225,479.8						
2/24/2008	147.2	1.044	211,927	221,278.7						
2/25/2008	150.0	1.039	216,051	224,468.4						
2/26/2008	150.0	1.049	216,041	226,573.9						
2/27/2008	150.0	1.030	216,058	222,643.9						
2/28/2008	184.7	1.043	266,028	277,497.1						
2/29/2008	115.3	1.045	166,028	173,535.2	5,559,713	5,802,746	1.044	16,371,146	17,212,728	1.051
3/1/2008	154.8	1.049	222,871	233,830.6						
3/2/2008	160.3	1.051	230,896	242,771.3						
3/3/2008	165.0	1.058	237,547	251,251.3						
3/4/2008	121.7	1.056	175,179	185,023.6						
3/5/2008	150.0	1.058	216,053	228,482.2						
3/6/2008	142.4	1.057	205,027	216,695.1						
3/7/2008	142.7	1.067	205,429	219,192.9						
3/8/2008	150.0	1.077	216,057	232,787.0						
3/9/2008	145.0	1.077	208,739	224,890.7						
3/10/2008	152.0	1.068	218,888	233,865.5						
3/11/2008	110.1	1.056	158,543	167,489.0						
3/12/2008	130.9	1.043	188,448	196,542.9						
3/13/2008	152.0	1.057	218,826	231,231.4						
3/14/2008	151.8	1.079	218,541	235,819.3						
3/15/2008	150.0	1.073	216,069	231,854.5						
3/16/2008	150.1	1.074	216,097	232,034.2						
3/17/2008	150.0	1.060	216,016	228,887.3						
3/18/2008	150.1	1.053	216,199	227,740.3						
3/19/2008	156.0	1.063	224,579	238,635.4						
3/20/2008	150.0	1.054	216,061	227,832.6						
3/21/2008	150.0	1.054	216,019	227,732.4						
3/22/2008	146.9	1.067	211,594	225,861.7						
3/23/2008	147.2	1.066	211,939	226,029.3						
3/24/2008	149.3	1.068	215,029	229,551.4						
3/25/2008	150.0	1.087	216,056	234,833.4						
3/26/2008	151.8	1.073	218,632	234,663.0						
3/27/2008	154.0	1.073	221,831	238,087.1						
3/28/2008	82.5	1.081	118,805	128,404.1						
3/29/2008	40.0	1.085	57,595	62,497.5						
3/30/2008	38.2	1.085	55,071	59,766.8						
3/31/2008	37.2	1.089	53,598	58,345.7	6,022,237	6,412,630	1.065	17,036,389	17,924,530	1.052

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2008	36.2	1.088	52,105	56,670.8						
4/2/2008	35.1	1.088	50,573	55,039.4						
4/3/2008	123.6	1.088	177,969	193,602.7						
4/4/2008	153.6	1.065	221,128	235,494.0						
4/5/2008	155.0	1.061	223,259	236,926.6						
4/6/2008	143.7	1.077	206,989	222,951.6						
4/7/2008	125.1	1.072	180,166	193,157.1						
4/8/2008	37.6	1.062	54,108	57,457.7						
4/9/2008	0.0	1.058	0	0.0						
4/10/2008	0.0	1.059	0	0.0						
4/11/2008	0.0	1.061	0	0.0						
4/12/2008	0.0	1.058	0	0.0						
4/13/2008	129.7	1.054	186,814	196,853.5						
4/14/2008	150.0	1.056	215,973	227,990.7						
4/15/2008	153.7	1.059	221,274	234,356.0						
4/16/2008	150.0	1.057	216,041	228,256.8						
4/17/2008	150.1	1.059	216,077	228,895.3						
4/18/2008	154.6	1.054	222,644	234,680.4						
4/19/2008	150.9	1.071	217,314	232,836.6						
4/20/2008	150.0	1.060	216,030	228,958.5						
4/21/2008	150.1	1.067	216,135	230,607.2						
4/22/2008	152.4	1.058	219,395	232,202.4						
4/23/2008	147.3	1.057	212,160	224,232.0						
4/24/2008	148.1	1.071	213,210	228,306.0						
4/25/2008	149.5	1.081	215,254	232,794.2						
4/26/2008	155.1	1.081	223,381	241,375.0						
4/27/2008	150.0	1.179	216,019	254,756.7						
4/28/2008	150.0	1.075	216,020	232,269.1						
4/29/2008	151.7	1.083	218,477	236,542.9						
4/30/2008	154.5	1.074	222,521	239,036.8	5,051,035	5,416,250	1.072	16,632,985	17,631,626	1.060
5/1/2008	156.3	1.077	225,043	242,337.4						
5/2/2008	156.6	1.055	225,574	238,054.1						
5/3/2008	21.2	1.042	30,460	31,747.7						
5/4/2008	0.0	1.042	0	0.0						
5/5/2008	0.0	1.044	0	0.0						
5/6/2008	0.0	1.043	0	0.0						
5/7/2008	0.0	1.043	0	0.0						
5/8/2008	60.9	1.042	87,699	91,406.2						
5/9/2008	120.7	1.036	173,788	180,009.5						
5/10/2008	68.2	1.032	98,207	101,349.4						
5/11/2008	155.1	1.048	223,316	234,059.0						
5/12/2008	157.5	1.049	226,805	237,968.2						
5/13/2008	159.8	1.059	230,115	243,766.8						
5/14/2008	160.3	1.062	230,764	245,102.0						
5/15/2008	151.9	1.056	218,751	231,050.0						
5/16/2008	104.2	1.057	150,073	158,667.7						
5/17/2008	144.0	1.051	207,341	217,819.5						
5/18/2008	150.1	1.062	216,162	229,486.8						
5/19/2008	133.4	1.070	192,116	205,566.9						
5/20/2008	145.6	1.072	209,717	224,884.9						
5/21/2008	49.9	1.081	71,869	77,717.5						
5/22/2008	133.1	1.058	191,620	202,800.5						
5/23/2008	150.2	1.063	216,339	230,010.6						
5/24/2008	150.1	1.069	216,076	230,942.6						
5/25/2008	135.5	1.087	195,117	212,145.5						
5/26/2008	126.9	1.058	182,721	193,370.6						
5/27/2008	150.1	1.057	216,178	228,604.9						
5/28/2008	41.5	1.062	59,713	63,409.4						
5/29/2008	0.0	1.060	0	0.0						
5/30/2008	37.6	1.061	54,117	57,410.4						
5/31/2008	175.4	1.050	252,637	265,230.0	4,602,318	4,874,918	1.059	15,675,589	16,703,798	1.066

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2008	153.8	1.044	221,488	231,211.8						
6/2/2008	155.1	1.037	223,341	231,712.4						
6/3/2008	100.2	1.049	144,267	151,277.4						
6/4/2008	154.1	1.064	221,865	236,043.7						
6/5/2008	154.3	1.052	222,249	233,785.5						
6/6/2008	155.0	1.055	223,270	235,622.8						
6/7/2008	146.1	1.056	210,379	222,239.9						
6/8/2008	150.1	1.061	216,096	229,360.9						
6/9/2008	119.0	1.054	171,337	180,590.8						
6/10/2008	0.0	1.030	0	0.0						
6/11/2008	66.6	1.031	95,955	98,911.9						
6/12/2008	149.9	1.057	215,918	228,238.2						
6/13/2008	149.9	1.051	215,928	227,033.4						
6/14/2008	150.5	1.057	216,697	228,977.3						
6/15/2008	150.3	1.120	216,444	242,337.5						
6/16/2008	146.1	1.050	210,373	220,837.6						
6/17/2008	148.7	1.061	214,115	227,078.7						
6/18/2008	150.0	1.047	215,958	226,148.7						
6/19/2008	134.0	1.045	192,913	201,575.9						
6/20/2008	149.8	1.040	215,684	224,302.9						
6/21/2008	150.1	1.046	216,183	226,218.8						
6/22/2008	165.7	1.053	238,604	251,163.1						
6/23/2008	3.2	1.053	4,643	4,888.7						
6/24/2008	81.4	1.052	117,159	123,202.8						
6/25/2008	160.0	1.059	230,385	243,991.3						
6/26/2008	152.0	1.042	218,828	227,958.8						
6/27/2008	150.1	1.046	216,127	225,962.1						
6/28/2008	152.4	1.043	219,419	228,903.8						
6/29/2008	157.2	1.057	226,383	239,254.4						
6/30/2008	99.5	1.064	143,322	152,548.5	5,695,331	6,001,380	1.054	15,348,684	16,292,547	1.061
7/1/2008	153.4	1.052	220,929	232,423.8						
7/2/2008	154.6	1.069	222,651	237,981.7						
7/3/2008	159.7	1.064	229,908	244,531.3						
7/4/2008	154.7	1.042	222,828	232,154.8						
7/5/2008	150.0	1.042	216,036	225,078.1						
7/6/2008	150.0	1.056	216,033	228,066.4						
7/7/2008	156.3	1.048	225,133	235,828.0						
7/8/2008	151.3	1.052	217,870	229,147.9						
7/9/2008	156.6	1.060	225,469	238,976.8						
7/10/2008	150.0	1.059	216,064	228,819.1						
7/11/2008	150.0	1.057	216,042	228,359.7						
7/12/2008	57.4	1.049	82,671	86,731.4						
7/13/2008	0.0	1.050	0	0.0						
7/14/2008	0.0	1.052	0	0.0						
7/15/2008	0.0	1.049	0	0.0						
7/16/2008	0.0	1.047	0	0.0						
7/17/2008	0.0	1.046	0	0.0						
7/18/2008	0.0	1.042	0	0.0						
7/19/2008	0.0	1.042	0	0.0						
7/20/2008	0.0	1.042	0	0.0						
7/21/2008	7.1	1.042	10,281	10,707.9						
7/22/2008	155.0	1.042	223,218	232,488.6						
7/23/2008	157.1	1.046	226,170	236,467.1						
7/24/2008	158.0	1.028	227,590	233,879.2						
7/25/2008	155.4	1.037	223,816	232,032.8						
7/26/2008	155.1	1.016	223,288	226,943.6						
7/27/2008	151.9	1.051	218,757	229,814.1						
7/28/2008	150.1	1.056	216,110	228,129.6						
7/29/2008	152.9	1.043	220,155	229,584.4						
7/30/2008	155.0	1.048	223,196	233,994.1						
7/31/2008	154.9	1.055	223,100	235,397.5	4,747,317	4,977,538	1.048	15,044,966	15,853,836	1.054

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2008	152.6	1.059	219,701	232,587.8						
8/2/2008	150.0	1.053	216,046	227,543.4						
8/3/2008	150.0	1.052	216,044	227,325.3						
8/4/2008	150.3	1.035	216,387	224,060.6						
8/5/2008	156.5	1.043	225,387	235,138.8						
8/6/2008	150.0	1.048	216,070	226,490.5						
8/7/2008	51.1	1.058	73,520	77,774.9						
8/8/2008	3.6	1.029	5,233	5,386.0						
8/9/2008	12.9	1.015	18,545	18,831.8						
8/10/2008	156.2	1.015	224,903	228,374.8						
8/11/2008	154.9	1.016	223,095	226,707.3						
8/12/2008	158.3	1.004	228,007	228,837.6						
8/13/2008	155.1	1.074	223,310	239,849.4						
8/14/2008	152.9	1.064	220,220	234,309.6						
8/15/2008	150.0	1.063	216,034	229,695.8						
8/16/2008	151.0	1.056	217,440	229,610.9						
8/17/2008	153.9	1.053	221,611	233,394.5						
8/18/2008	152.7	1.046	219,881	229,903.8						
8/19/2008	149.9	1.050	215,806	226,498.1						
8/20/2008	150.1	1.054	216,118	227,871.6						
8/21/2008	205.0	1.057	295,257	312,153.9						
8/22/2008	226.6	1.049	326,345	342,496.3						
8/23/2008	210.3	1.051	302,781	318,145.2						
8/24/2008	203.6	1.037	293,185	303,957.6						
8/25/2008	203.9	1.052	293,549	308,768.7						
8/26/2008	160.5	1.047	231,089	241,914.8						
8/27/2008	162.3	1.050	233,727	245,345.3						
8/28/2008	155.4	1.054	223,825	235,813.1						
8/29/2008	150.2	1.017	216,350	220,023.7						
8/30/2008	157.9	1.036	227,366	235,635.5						
8/31/2008	157.8	1.053	227,285	239,406.0	6,704,116	7,013,853	1.046	17,146,764	17,992,770	1.049
9/1/2008	155.8	1.051	224,399	235,833.2						
9/2/2008	155.4	1.058	223,839	236,885.2						
9/3/2008	21.8	1.021	31,434	32,096.0						
9/4/2008	0.0	1.016	0	0.0						
9/5/2008	0.0	1.016	0	0.0						
9/6/2008	93.6	1.020	134,799	137,457.0						
9/7/2008	145.9	1.049	210,025	220,220.9						
9/8/2008	150.2	1.056	216,304	228,311.2						
9/9/2008	150.0	1.065	216,069	230,118.3						
9/10/2008	151.0	1.045	217,455	227,209.3						
9/11/2008	9.8	1.045	14,169	14,811.7						
9/12/2008	0.0	0.000	0	0.0						
9/13/2008	0.0	0.000	0	0.0						
9/14/2008	0.0	0.000	0	0.0						
9/15/2008	8.3	1.044	11,998	12,523.2						
9/16/2008	51.7	1.030	74,395	76,610.1						
9/17/2008	157.4	1.010	226,702	228,905.2						
9/18/2008	150.0	1.018	216,061	219,861.6						
9/19/2008	154.7	1.004	222,706	223,586.6						
9/20/2008	153.4	1.003	220,867	221,471.5						
9/21/2008	135.7	1.006	195,370	196,472.4						
9/22/2008	150.4	1.002	216,517	216,859.9						
9/23/2008	154.1	1.002	221,967	222,318.8						
9/24/2008	11.6	1.002	16,641	16,667.3						
9/25/2008	104.7	1.002	150,799	151,037.3						
9/26/2008	161.6	1.004	232,727	233,689.0						
9/27/2008	0.9	1.002	1,294	1,296.5						
9/28/2008	0.0	1.002	0	0.0						
9/29/2008	0.0	1.001	0	0.0						
9/30/2008	8.6	1.002	12,385	12,411.4	3,508,922	3,596,654	1.025	14,960,354	15,588,044	1.042

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2008	140.5	1.021	202,339	206,611.0						
10/2/2008	73.1	1.045	105,303	110,053.8						
10/3/2008	0.8	1.034	1,179	1,218.9						
10/4/2008	0.0	1.033	0	0.0						
10/5/2008	0.0	1.034	0	0.0						
10/6/2008	0.0	1.033	0	0.0						
10/7/2008	87.7	1.032	126,342	130,392.2						
10/8/2008	160.8	1.033	231,517	239,097.8						
10/9/2008	86.1	1.005	124,021	124,693.4						
10/10/2008	149.9	1.043	215,843	225,231.5						
10/11/2008	82.3	1.038	118,522	123,076.6						
10/12/2008	151.1	1.034	217,630	224,962.2						
10/13/2008	155.9	1.045	224,542	234,605.0						
10/14/2008	156.6	1.043	225,541	235,254.0						
10/15/2008	67.9	1.041	97,808	101,820.6						
10/16/2008	25.2	1.014	36,350	36,875.3						
10/17/2008	105.5	1.019	151,888	154,713.9						
10/18/2008	10.9	1.022	15,630	15,967.6						
10/19/2008	0.0	1.020	0	0.0						
10/20/2008	0.0	1.020	0	0.0						
10/21/2008	0.0	1.021	0	0.0						
10/22/2008	0.0	1.020	0	0.0						
10/23/2008	42.4	1.020	61,125	62,348.0						
10/24/2008	0.1	1.007	99	100.2						
10/25/2008	101.9	1.049	146,806	153,947.1						
10/26/2008	97.3	1.054	140,058	147,571.2						
10/27/2008	152.9	1.059	220,209	233,134.0						
10/28/2008	162.2	1.065	233,634	248,731.8						
10/29/2008	161.0	1.067	231,895	247,491.5						
10/30/2008	153.5	1.070	221,060	236,617.9						
10/31/2008	309.8	1.068	446,098	476,343.8	3,795,438	3,970,859	1.046	14,008,475	14,581,366	1.041
11/1/2008	153.3	1.073	220,820	237,035.0						
11/2/2008	158.9	1.070	228,882	244,796.7						
11/3/2008	165.0	1.079	237,597	256,332.3						
11/4/2008	161.5	1.077	232,617	250,555.9						
11/5/2008	155.5	1.071	223,898	239,881.3						
11/6/2008	149.1	1.067	214,666	229,110.2						
11/7/2008	81.6	1.067	117,443	125,288.8						
11/8/2008	75.0	1.067	107,946	115,218.6						
11/9/2008	65.0	1.070	93,657	100,253.6						
11/10/2008	55.2	1.064	79,545	84,654.5						
11/11/2008	0.0	1.066	14	14.4						
11/12/2008	38.5	1.067	55,422	59,144.7						
11/13/2008	159.9	1.065	230,240	245,219.6						
11/14/2008	155.0	1.074	223,171	239,770.3						
11/15/2008	150.2	1.061	216,332	229,494.0						
11/16/2008	140.9	1.052	202,932	213,451.7						
11/17/2008	141.7	1.047	204,116	213,665.9						
11/18/2008	116.9	1.048	168,332	176,412.0						
11/19/2008	50.3	1.047	72,412	75,846.5						
11/20/2008	88.5	1.051	127,381	133,926.1						
11/21/2008	115.2	1.048	165,913	173,912.4						
11/22/2008	149.8	1.044	215,768	225,169.3						
11/23/2008	150.1	1.069	216,168	231,073.6						
11/24/2008	150.3	1.056	216,378	228,395.4						
11/25/2008	151.7	1.076	218,406	235,056.2						
11/26/2008	151.1	1.066	217,571	232,001.1						
11/27/2008	152.4	1.065	219,456	233,814.7						
11/28/2008	150.0	1.079	216,018	233,075.3						
11/29/2008	107.2	1.061	154,323	163,680.1						
11/30/2008	149.1	1.076	214,734	230,986.8	5,312,157	5,657,237	1.065	12,616,517	13,224,750	1.048

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2008	150.5	1.084	216,681	234,882.0						
12/2/2008	155.3	1.092	223,563	244,060.2						
12/3/2008	151.3	1.076	217,882	234,477.7						
12/4/2008	150.0	1.063	216,053	229,722.1						
12/5/2008	46.2	1.069	66,462	71,037.5						
12/6/2008	0.0	1.066	0	0.0						
12/7/2008	0.0	1.062	0	0.0						
12/8/2008	0.0	1.065	0	0.0						
12/9/2008	101.1	1.066	145,599	155,163.5						
12/10/2008	153.1	1.066	220,489	235,015.1						
12/11/2008	139.1	1.059	200,369	212,282.2						
12/12/2008	150.0	1.071	216,056	231,326.9						
12/13/2008	150.4	1.076	216,582	232,953.8						
12/14/2008	154.1	1.081	221,877	239,792.2						
12/15/2008	121.9	1.072	175,587	188,184.1						
12/16/2008	34.0	1.069	48,927	52,313.0						
12/17/2008	150.0	1.080	216,053	233,279.5						
12/18/2008	150.0	1.089	216,070	235,199.0						
12/19/2008	150.0	1.093	216,048	236,096.0						
12/20/2008	150.0	1.098	216,036	237,224.5						
12/21/2008	150.0	1.095	215,988	236,564.1						
12/22/2008	150.0	1.073	216,067	231,915.6						
12/23/2008	133.3	1.082	191,942	207,708.6						
12/24/2008	150.0	1.083	216,041	233,985.9						
12/25/2008	186.8	1.070	269,038	287,848.1						
12/26/2008	13.3	1.070	19,191	20,543.5						
12/27/2008	0.0	1.069	0	0.0						
12/28/2008	0.0	1.068	0	0.0						
12/29/2008	0.0	1.068	0	0.0						
12/30/2008	0.0	1.066	0	0.0						
12/31/2008	0.0	1.065	0	0.0	4,378,603	4,721,575	1.078	13,486,198	14,349,671	1.064
1/1/2009	0.0	1.066	14	14.4						
1/2/2009	0.0	1.067	14	14.4						
1/3/2009	0.0	1.068	14	14.4						
1/4/2009	32.8	1.069	47,294	50,552.5						
1/5/2009	150.0	1.015	216,020	219,294.5						
1/6/2009	31.4	1.091	45,176	49,300.3						
1/7/2009	0.0	1.091	14	14.8						
1/8/2009	0.0	1.092	14	14.8						
1/9/2009	12.7	1.092	18,221	19,898.6						
1/10/2009	150.1	1.091	216,086	235,713.9						
1/11/2009	28.2	1.094	40,555	44,358.7						
1/12/2009	36.2	1.091	52,155	56,905.5						
1/13/2009	66.4	1.092	95,620	104,450.1						
1/14/2009	0.0	1.097	14	14.8						
1/15/2009	54.5	1.093	78,450	85,761.2						
1/16/2009	150.0	1.068	216,067	230,683.5						
1/17/2009	34.0	1.071	48,933	52,400.0						
1/18/2009	0.0	1.071	14	14.5						
1/19/2009	0.0	1.064	14	14.4						
1/20/2009	0.0	1.069	14	14.5						
1/21/2009	4.9	1.070	7,061	7,553.1						
1/22/2009	12.1	1.080	17,433	18,819.5						
1/23/2009	65.2	1.054	93,954	99,057.3						
1/24/2009	104.5	1.075	150,520	161,871.1						
1/25/2009	0.0	1.087	14	14.7						
1/26/2009	0.0	1.087	14	14.7						
1/27/2009	17.7	1.087	25,550	27,778.5						
1/28/2009	62.3	1.086	89,718	97,419.3						
1/29/2009	98.3	1.062	141,553	150,318.1						
1/30/2009	52.9	1.056	76,235	80,524.3						
1/31/2009	98.3	1.031	141,613	146,056.0	1,818,362	1,938,876	1.066	11,509,122	12,317,688	1.070

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2009	138.0	1.039	198,712	206,368.1						
2/2/2009	155.0	1.047	223,134	233,563.5						
2/3/2009	152.9	1.045	220,174	230,069.1						
2/4/2009	148.3	1.066	213,516	227,654.6						
2/5/2009	102.1	1.056	146,967	155,252.4						
2/6/2009	62.9	1.057	90,596	95,736.3						
2/7/2009	152.4	1.064	219,432	233,477.1						
2/8/2009	155.0	1.062	223,183	237,021.7						
2/9/2009	155.0	1.076	223,230	240,301.8						
2/10/2009	155.9	1.083	224,451	243,129.8						
2/11/2009	45.2	1.082	65,137	70,499.9						
2/12/2009	89.6	1.080	128,987	139,334.0						
2/13/2009	149.9	1.100	215,802	237,337.7						
2/14/2009	111.8	1.091	160,981	175,677.5						
2/15/2009	113.0	1.094	162,709	178,048.3						
2/16/2009	120.4	1.101	173,406	190,948.9						
2/17/2009	49.5	1.056	71,343	75,353.3						
2/18/2009	0.3	1.073	412	441.8						
2/19/2009	42.9	1.077	61,731	66,475.4						
2/20/2009	150.0	1.061	216,059	229,306.8						
2/21/2009	150.0	1.075	216,023	232,293.8						
2/22/2009	150.0	1.040	216,038	224,714.0						
2/23/2009	154.0	1.072	221,720	237,742.4						
2/24/2009	155.0	1.078	223,203	240,694.4						
2/25/2009	157.7	1.091	227,112	247,780.4						
2/26/2009	157.9	1.090	227,361	247,875.0						
2/27/2009	151.0	1.100	217,412	239,142.9						
2/28/2009	150.1	1.100	216,087	237,732.1	5,004,917	5,373,973	1.074	11,201,883	12,034,424	1.074
3/1/2009	121.8	1.112	175,421	195,097.7						
3/2/2009	0.0	1.103	14	14.9						
3/3/2009	144.9	1.108	208,639	231,150.9						
3/4/2009	155.0	1.092	223,228	243,720.3						
3/5/2009	154.8	1.081	222,924	241,065.6						
3/6/2009	158.4	1.084	228,103	247,313.3						
3/7/2009	153.2	1.056	220,614	233,062.1						
3/8/2009	122.7	1.053	176,623	186,049.5						
3/9/2009	0.6	1.065	853	908.6						
3/10/2009	23.5	1.065	33,834	36,017.7						
3/11/2009	154.3	1.058	222,211	235,010.1						
3/12/2009	160.8	1.050	231,503	243,053.7						
3/13/2009	159.0	1.044	228,981	239,080.3						
3/14/2009	165.3	1.053	237,962	250,635.1						
3/15/2009	160.9	1.050	231,701	243,199.7						
3/16/2009	151.6	1.053	218,263	229,900.7						
3/17/2009	151.1	1.066	217,600	231,940.2						
3/18/2009	151.1	1.064	217,625	231,613.4						
3/19/2009	76.5	1.062	110,088	116,890.6						
3/20/2009	0.0	1.058	14	14.3						
3/21/2009	70.8	1.051	101,939	107,090.2						
3/22/2009	169.3	1.055	243,815	257,111.8						
3/23/2009	158.7	1.057	228,457	241,482.8						
3/24/2009	156.8	1.042	225,784	235,305.6						
3/25/2009	4.5	1.053	6,413	6,755.3						
3/26/2009	38.1	1.085	54,853	59,541.0						
3/27/2009	155.5	1.073	223,970	240,301.1						
3/28/2009	155.8	1.051	224,383	235,904.8						
3/29/2009	161.1	1.014	232,000	235,346.5						
3/30/2009	115.2	1.039	165,818	172,311.8						
3/31/2009	108.6	1.055	156,318	164,989.8	5,269,951	5,591,879	1.061	12,093,231	12,904,729	1.067

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2009	95.7	1.054	137,798	145,261.4						
4/2/2009	163.2	1.045	235,001	245,637.1						
4/3/2009	146.1	1.049	210,326	220,556.7						
4/4/2009	80.6	1.036	116,019	120,195.7						
4/5/2009	157.5	1.050	226,857	238,282.2						
4/6/2009	157.1	1.045	226,154	236,413.3						
4/7/2009	82.4	1.043	118,614	123,731.9						
4/8/2009	112.1	1.049	161,397	169,229.1						
4/9/2009	106.3	1.059	153,039	162,053.9						
4/10/2009	158.8	1.058	228,608	241,976.3						
4/11/2009	158.6	1.066	228,421	243,484.4						
4/12/2009	157.6	1.072	226,884	243,326.3						
4/13/2009	165.2	1.077	237,845	256,270.6						
4/14/2009	168.6	1.053	242,855	255,625.4						
4/15/2009	161.3	1.054	232,246	244,737.7						
4/16/2009	159.5	1.053	229,610	241,696.2						
4/17/2009	154.6	1.056	222,651	235,097.8						
4/18/2009	156.8	1.053	225,776	237,837.4						
4/19/2009	161.1	1.039	231,973	241,107.8						
4/20/2009	161.1	1.034	231,917	239,865.1						
4/21/2009	160.4	1.038	231,040	239,855.9						
4/22/2009	160.0	1.041	230,334	239,787.8						
4/23/2009	160.0	1.035	230,385	238,338.3						
4/24/2009	158.1	1.034	227,670	235,362.9						
4/25/2009	156.7	1.033	225,701	233,231.4						
4/26/2009	155.6	1.036	224,096	232,058.4						
4/27/2009	158.4	1.046	228,026	238,523.6						
4/28/2009	157.2	1.032	226,308	233,635.8						
4/29/2009	97.7	1.019	140,651	143,354.7						
4/30/2009	35.0	1.019	50,452	51,398.4	6,138,655	6,427,933	1.047	16,413,523	17,393,786	1.060
5/1/2009	116.5	1.046	167,790	175,578.2						
5/2/2009	160.7	1.009	231,408	233,449.7						
5/3/2009	35.0	1.076	50,388	54,201.4						
5/4/2009	134.9	1.043	194,299	202,637.0						
5/5/2009	150.6	1.051	216,890	227,874.1						
5/6/2009	157.8	1.046	227,267	237,735.2						
5/7/2009	156.8	1.041	225,739	235,031.8						
5/8/2009	161.2	1.048	232,191	243,270.2						
5/9/2009	158.5	1.050	228,169	239,686.1						
5/10/2009	166.6	1.062	239,962	254,885.4						
5/11/2009	155.7	1.066	224,233	239,036.3						
5/12/2009	150.2	1.069	216,261	231,276.0						
5/13/2009	152.6	1.073	219,712	235,683.5						
5/14/2009	154.9	1.073	223,084	239,429.1						
5/15/2009	155.0	1.071	223,217	239,066.0						
5/16/2009	155.0	1.070	223,235	238,769.7						
5/17/2009	107.6	1.070	154,935	165,819.7						
5/18/2009	66.6	1.087	95,944	104,259.9						
5/19/2009	148.3	1.071	213,508	228,750.9						
5/20/2009	145.0	1.072	208,756	223,752.0						
5/21/2009	14.3	1.103	20,595	22,718.2						
5/22/2009	64.9	1.092	93,468	102,077.6						
5/23/2009	158.1	1.081	227,644	246,191.0						
5/24/2009	81.0	1.095	116,637	127,688.5						
5/25/2009	30.9	1.105	44,504	49,176.0						
5/26/2009	0.0	1.072	14	14.5						
5/27/2009	0.0	1.110	14	15.0						
5/28/2009	4.3	1.106	6,160	6,812.8						
5/29/2009	65.3	1.087	94,046	102,221.5						
5/30/2009	159.1	1.052	229,059	241,019.7						
5/31/2009	161.0	1.046	231,871	242,614.3	5,080,997	5,390,741	1.061	16,489,602	17,410,554	1.056

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2009	162.7	1.049	234,307	245,741.5						
6/2/2009	159.1	1.057	229,067	242,102.4						
6/3/2009	154.7	1.055	222,774	235,122.9						
6/4/2009	157.7	1.070	227,031	242,820.9						
6/5/2009	159.8	1.071	230,046	246,408.5						
6/6/2009	63.5	1.062	91,463	97,176.2						
6/7/2009	0.0	1.065	14	14.4						
6/8/2009	0.0	1.067	14	14.4						
6/9/2009	0.0	1.067	14	14.4						
6/10/2009	0.0	1.066	14	14.4						
6/11/2009	0.0	1.066	14	14.4						
6/12/2009	0.0	1.067	14	14.4						
6/13/2009	0.0	1.067	14	14.4						
6/14/2009	0.0	1.067	14	14.4						
6/15/2009	0.0	1.037	28	28.7						
6/16/2009	0.0	1.066	14	14.4						
6/17/2009	7.2	1.066	10,353	11,040.6						
6/18/2009	153.4	1.067	220,867	235,773.1						
6/19/2009	153.4	1.046	220,830	230,996.3						
6/20/2009	156.0	1.078	224,704	242,178.7						
6/21/2009	156.8	1.065	225,724	240,352.5						
6/22/2009	148.6	1.070	213,939	228,977.0						
6/23/2009	152.7	1.065	219,893	234,103.6						
6/24/2009	153.0	1.060	220,352	233,476.2						
6/25/2009	150.8	1.074	217,092	233,224.7						
6/26/2009	10.0	1.072	14,428	15,471.5						
6/27/2009	0.0	1.068	14	14.4						
6/28/2009	0.0	1.069	14	14.5						
6/29/2009	0.0	1.107	14	15.0						
6/30/2009	0.0	1.069	14	14.5	3,023,072	3,215,184	1.064	14,242,723	15,033,858	1.056
7/1/2009	0.0	1.070	14	14.5						
7/2/2009	0.0	1.065	14	14.4						
7/3/2009	0.0	1.070	14	14.5						
7/4/2009	0.0	1.069	14	14.5						
7/5/2009	0.0	1.070	14	14.5						
7/6/2009	16.8	1.071	24,240	25,959.8						
7/7/2009	158.3	1.086	227,880	247,472.2						
7/8/2009	60.9	1.086	87,686	95,270.3						
7/9/2009	149.1	1.079	214,634	231,619.3						
7/10/2009	98.3	1.054	141,527	149,193.0						
7/11/2009	6.9	1.053	9,965	10,493.7						
7/12/2009	0.0	1.053	14	14.2						
7/13/2009	0.0	1.054	14	14.3						
7/14/2009	0.0	1.052	14	14.2						
7/15/2009	0.0	1.054	14	14.3						
7/16/2009	0.0	1.054	14	14.3						
7/17/2009	0.0	1.055	14	14.3						
7/18/2009	0.0	1.053	14	14.2						
7/19/2009	46.2	1.053	66,496	70,020.4						
7/20/2009	153.0	1.066	220,304	234,902.1						
7/21/2009	152.3	1.056	219,354	231,548.3						
7/22/2009	149.5	1.062	215,343	228,726.4						
7/23/2009	147.5	1.058	212,453	224,825.9						
7/24/2009	29.9	1.050	43,051	45,187.3						
7/25/2009	0.0	1.049	14	14.2						
7/26/2009	0.0	1.048	14	14.2						
7/27/2009	0.0	1.049	14	14.2						
7/28/2009	0.0	1.048	14	14.2						
7/29/2009	0.0	1.050	14	14.2						
7/30/2009	0.0	1.050	14	14.2						
7/31/2009	85.2	1.057	122,712	129,736.3	1,805,890	1,925,212	1.066	9,909,958	10,531,137	1.063

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2009	154.3	1.065	222,126	236,495.6						
8/2/2009	113.2	1.056	162,951	172,024.7						
8/3/2009	0.0	1.039	14	14.1						
8/4/2009	0.0	1.037	14	14.7						
8/5/2009	0.0	1.107	14	15.0						
8/6/2009	77.9	1.035	112,159	116,032.0						
8/7/2009	90.2	1.060	129,910	137,642.6						
8/8/2009	99.3	1.058	143,005	151,348.5						
8/9/2009	153.0	1.063	220,275	234,074.8						
8/10/2009	153.0	1.066	220,286	234,920.1						
8/11/2009	150.3	1.071	216,494	231,956.8						
8/12/2009	64.4	1.069	92,713	99,154.5						
8/13/2009	0.0	1.068	14	14.4						
8/14/2009	30.4	1.065	43,721	46,575.0						
8/15/2009	161.1	1.065	232,036	247,195.2						
8/16/2009	121.8	1.059	175,375	185,724.4						
8/17/2009	0.0	1.061	14	14.3						
8/18/2009	98.9	1.060	142,460	151,071.1						
8/19/2009	165.2	1.065	237,944	253,363.5						
8/20/2009	158.1	1.072	227,687	244,056.3						
8/21/2009	118.7	1.064	170,902	181,894.5						
8/22/2009	0.0	1.022	14	13.8						
8/23/2009	92.5	1.021	133,230	136,036.3						
8/24/2009	139.6	1.013	201,068	203,712.8						
8/25/2009	51.0	1.011	73,385	74,155.9						
8/26/2009	0.0	1.010	14	13.7						
8/27/2009	0.0	1.009	14	13.7						
8/28/2009	0.0	1.009	14	13.7						
8/29/2009	0.0	1.010	14	13.7						
8/30/2009	0.0	1.010	14	13.7						
8/31/2009	0.0	1.010	14	13.7	3,157,891	3,337,603	1.057	7,986,853	8,477,999	1.061
9/1/2009	5.7	1.010	8,152	8,232.2						
9/2/2009	14.4	1.012	20,799	21,045.1						
9/3/2009	16.8	1.010	24,132	24,361.7						
9/4/2009	159.7	1.010	229,900	232,088.5						
9/5/2009	64.2	1.007	92,404	93,022.5						
9/6/2009	153.0	1.056	220,385	232,694.3						
9/7/2009	155.7	1.055	224,237	236,632.9						
9/8/2009	152.2	1.052	219,100	230,602.3						
9/9/2009	0.0	1.053	14	14.2						
9/10/2009	0.0	1.051	14	14.2						
9/11/2009	1.0	1.105	1,410	1,556.9						
9/12/2009	151.1	1.051	217,616	228,706.1						
9/13/2009	162.1	1.058	233,386	246,849.5						
9/14/2009	161.7	1.054	232,787	245,260.0						
9/15/2009	59.9	1.029	86,254	88,771.1						
9/16/2009	90.6	1.034	130,404	134,897.6						
9/17/2009	142.3	1.015	204,909	207,946.6						
9/18/2009	144.5	1.035	208,073	215,406.7						
9/19/2009	141.0	1.075	203,025	218,193.1						
9/20/2009	154.2	1.054	222,108	234,022.3						
9/21/2009	151.5	1.063	218,171	231,849.0						
9/22/2009	42.1	1.048	60,566	63,470.2						
9/23/2009	0.0	1.022	14	13.8						
9/24/2009	93.2	1.021	134,154	137,020.6						
9/25/2009	155.6	1.052	224,036	235,725.1						
9/26/2009	155.5	1.059	223,967	237,218.1						
9/27/2009	153.0	1.057	220,277	232,870.9						
9/28/2009	29.5	1.047	42,545	44,547.1						
9/29/2009	121.2	1.047	174,502	182,678.4						
9/30/2009	0.0	1.007	14	13.6	4,077,350	4,265,725	1.046	9,041,131	9,528,540	1.054

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2009	58.4	1.008	84,049	84,682.2						
10/2/2009	149.6	1.071	215,400	230,683.6						
10/3/2009	148.0	1.047	213,059	222,997.3						
10/4/2009	147.4	1.059	212,293	224,876.2						
10/5/2009	41.3	1.075	59,461	63,948.1						
10/6/2009	0.0	1.074	14	14.5						
10/7/2009	0.0	1.075	14	14.5						
10/8/2009	0.0	1.075	14	14.5						
10/9/2009	139.7	1.074	201,115	215,936.3						
10/10/2009	154.1	1.044	221,960	231,726.0						
10/11/2009	145.9	1.048	210,025	220,117.2						
10/12/2009	145.0	1.052	208,731	219,608.1						
10/13/2009	145.0	1.060	208,785	221,291.7						
10/14/2009	140.5	1.069	202,266	216,214.1						
10/15/2009	148.1	1.052	213,228	224,262.5						
10/16/2009	153.4	1.063	220,939	234,765.6						
10/17/2009	106.8	1.053	153,742	161,948.8						
10/18/2009	113.8	1.051	163,832	172,214.5						
10/19/2009	148.4	1.057	213,740	225,948.7						
10/20/2009	147.4	1.048	212,293	222,386.6						
10/21/2009	128.8	1.023	185,432	189,623.8						
10/22/2009	0.0	1.011	145,874	147,418.5						
10/23/2009	0.0	1.012	210,376	212,892.0						
10/24/2009	135.4	1.027	194,966	200,314.5						
10/25/2009	161.6	1.042	232,732	242,557.3						
10/26/2009	149.2	1.051	214,918	225,845.6						
10/27/2009	0.0	1.042	211,801	220,687.3						
10/28/2009	0.0	1.039	183,921	191,055.8						
10/29/2009	144.9	1.037	208,633	216,320.3						
10/30/2009	98.5	1.006	141,807	142,613.4						
10/31/2009	143.7	1.003	206,913	207,610.7	5,352,330	5,590,590	1.045	12,587,571	13,193,918	1.048
11/1/2009	83.9	1.103	120,841	133,306.4						
11/2/2009	78.9	1.104	113,684	125,525.7						
11/3/2009	143.3	1.004	206,367	207,117.5						
11/4/2009	123.5	1.104	177,819	196,255.1						
11/5/2009	124.9	1.003	179,871	180,391.1						
11/6/2009	72.7	1.004	104,699	105,119.1						
11/7/2009	148.2	1.037	213,371	221,346.1						
11/8/2009	154.9	1.035	223,042	230,956.4						
11/9/2009	153.5	1.044	221,006	230,757.2						
11/10/2009	47.6	1.049	68,507	71,872.0						
11/11/2009	0.0	1.052	14	14.2						
11/12/2009	0.0	1.052	14	14.2						
11/13/2009	0.0	1.052	14	14.2						
11/14/2009	24.5	1.057	35,228	37,244.9						
11/15/2009	0.0	1.087	14	14.7						
11/16/2009	0.0	1.058	14	14.3						
11/17/2009	5.0	1.057	7,175	7,582.3						
11/18/2009	0.0	1.059	14	14.3						
11/19/2009	90.4	1.057	130,239	137,698.2						
11/20/2009	155.9	1.048	224,478	235,325.7						
11/21/2009	152.5	1.055	219,646	231,664.0						
11/22/2009	147.1	1.032	211,850	218,542.0						
11/23/2009	155.2	1.058	223,539	236,612.5						
11/24/2009	152.2	1.046	219,163	229,269.3						
11/25/2009	152.4	1.045	219,392	229,254.6						
11/26/2009	151.3	1.143	217,890	249,026.7						
11/27/2009	42.5	1.040	61,168	63,608.6						
11/28/2009	85.5	1.040	123,122	128,034.3						
11/29/2009	0.0	1.042	14	14.1						
11/30/2009	0.0	1.039	14	14.1	3,522,203	3,706,624	1.052	12,951,883	13,562,939	1.047

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2009	65.2	1.041	93,817	97,693.7						
12/2/2009	140.6	1.043	202,449	211,240.1						
12/3/2009	73.5	1.047	105,889	110,849.3						
12/4/2009	140.2	1.046	201,959	211,250.4						
12/5/2009	144.8	1.046	208,466	218,141.4						
12/6/2009	4.3	1.050	6,202	6,514.1						
12/7/2009	0.0	1.050	14	14.2						
12/8/2009	70.1	1.049	100,908	105,831.8						
12/9/2009	151.3	1.046	217,808	227,827.1						
12/10/2009	151.8	1.043	218,540	227,879.0						
12/11/2009	150.0	1.045	216,037	225,712.9						
12/12/2009	150.1	1.039	216,180	224,543.6						
12/13/2009	149.8	1.040	215,762	224,312.5						
12/14/2009	44.8	1.080	64,560	69,733.9						
12/15/2009	139.9	1.042	201,426	209,833.6						
12/16/2009	138.7	1.048	199,728	209,269.6						
12/17/2009	147.1	1.047	211,790	221,686.1						
12/18/2009	147.1	1.047	211,755	221,672.6						
12/19/2009	149.2	1.030	214,842	221,322.6						
12/20/2009	75.7	1.030	108,962	112,249.2						
12/21/2009	78.8	1.036	113,437	117,527.9						
12/22/2009	6.7	1.034	9,630	9,958.7						
12/23/2009	140.8	1.033	202,765	209,553.0						
12/24/2009	155.5	1.041	223,926	233,178.6						
12/25/2009	152.5	1.027	219,566	225,403.0						
12/26/2009	151.6	1.028	218,350	224,556.1						
12/27/2009	151.1	1.029	217,607	224,020.9						
12/28/2009	143.1	1.042	206,036	214,647.8						
12/29/2009	90.1	1.021	129,750	132,411.5						
12/30/2009	0.0	1.020	14	13.8						
12/31/2009	0.0	1.022	14	13.8	4,758,188	4,948,863	1.040	13,632,721	14,246,077	1.045
1/1/2010	107.4	1.027	154,594	158,769.1						
1/2/2010	154.9	1.033	223,032	230,487.7						
1/3/2010	100.0	1.039	144,057	149,725.6						
1/4/2010	147.0	1.041	211,610	220,261.6						
1/5/2010	95.2	1.040	137,099	142,583.4						
1/6/2010	57.1	1.050	82,165	86,307.0						
1/7/2010	25.0	1.052	36,016	37,893.2						
1/8/2010	25.0	1.054	35,993	37,926.0						
1/9/2010	23.9	1.049	34,432	36,104.9						
1/10/2010	22.4	1.049	32,228	33,797.0						
1/11/2010	21.9	1.046	31,498	32,954.7						
1/12/2010	35.4	1.048	50,925	53,345.7						
1/13/2010	150.1	1.041	216,186	225,026.6						
1/14/2010	40.4	1.040	58,170	60,493.6						
1/15/2010	138.1	1.042	198,876	207,281.1						
1/16/2010	136.3	1.138	196,290	223,379.6						
1/17/2010	135.5	1.046	195,169	204,147.9						
1/18/2010	137.7	1.046	198,255	207,366.0						
1/19/2010	80.8	1.051	116,377	122,294.2						
1/20/2010	0.0	1.045	14	14.1						
1/21/2010	85.2	1.042	122,648	127,780.3						
1/22/2010	135.1	1.030	194,567	200,343.7						
1/23/2010	138.0	1.041	198,763	206,839.9						
1/24/2010	26.5	1.041	38,121	39,674.4						
1/25/2010	0.0	1.042	14	14.1						
1/26/2010	0.0	1.042	14	14.1						
1/27/2010	0.0	1.042	14	14.1						
1/28/2010	0.0	1.041	14	14.1						
1/29/2010	33.4	1.042	48,035	50,037.5						
1/30/2010	150.0	1.050	215,977	226,808.9						
1/31/2010	150.0	1.024	216,009	221,160.7	3,387,159	3,542,861	1.046	11,667,550	12,198,348	1.045

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2010	152.0	1.042	218,822	228,056.1						
2/2/2010	149.8	1.049	215,642	226,126.5						
2/3/2010	149.5	1.046	215,215	225,032.5						
2/4/2010	150.9	1.047	217,275	227,391.5						
2/5/2010	153.4	1.039	220,863	229,378.6						
2/6/2010	59.4	1.032	85,522	88,281.0						
2/7/2010	81.8	1.034	117,743	121,697.9						
2/8/2010	132.1	1.037	190,235	197,222.9						
2/9/2010	63.8	1.045	91,940	96,076.1						
2/10/2010	77.8	1.025	112,095	114,926.8						
2/11/2010	140.0	1.039	201,583	209,501.9						
2/12/2010	131.6	1.040	189,446	197,041.4						
2/13/2010	142.2	1.052	204,752	215,476.7						
2/14/2010	106.7	1.042	153,655	160,150.5						
2/15/2010	93.4	1.011	134,544	136,073.4						
2/16/2010	105.1	1.036	151,312	156,750.3						
2/17/2010	120.9	1.045	174,090	181,934.6						
2/18/2010	133.1	1.058	191,624	202,799.1						
2/19/2010	32.4	1.053	46,681	49,174.2						
2/20/2010	133.2	1.029	191,829	197,403.2						
2/21/2010	132.0	1.029	190,018	195,539.5						
2/22/2010	133.4	1.033	192,055	198,453.9						
2/23/2010	133.5	1.044	192,305	200,787.1						
2/24/2010	133.3	1.062	191,940	203,861.1						
2/25/2010	133.1	1.059	191,639	202,856.1						
2/26/2010	148.1	1.062	213,234	226,555.1						
2/27/2010	148.5	1.068	213,775	228,321.1						
2/28/2010	146.6	1.042	211,099	220,055.0	4,920,933	5,136,924	1.044	13,066,280	13,628,648	1.043
3/1/2010	107.4	1.040	154,594	160,719.3						
3/2/2010	154.9	1.035	223,032	230,944.0						
3/3/2010	100.0	1.012	144,057	145,808.6						
3/4/2010	147.0	1.032	211,610	218,302.5						
3/5/2010	95.2	1.057	137,099	144,979.5						
3/6/2010	57.1	1.064	82,165	87,402.4						
3/7/2010	25.0	1.058	36,016	38,094.1						
3/8/2010	25.0	1.060	35,993	38,145.2						
3/9/2010	23.9	1.059	34,432	36,447.4						
3/10/2010	22.4	1.062	32,228	34,210.7						
3/11/2010	21.9	1.056	31,498	33,248.4						
3/12/2010	35.4	1.053	50,925	53,600.3						
3/13/2010	150.1	1.054	216,186	227,838.6						
3/14/2010	40.4	1.050	58,170	61,072.2						
3/15/2010	137.7	1.037	198,326	205,643.9						
3/16/2010	139.0	1.041	200,222	208,336.6						
3/17/2010	143.5	1.041	206,613	215,162.3						
3/18/2010	135.9	1.044	195,624	204,224.1						
3/19/2010	77.9	1.036	112,223	116,299.0						
3/20/2010	136.3	1.045	196,313	205,085.8						
3/21/2010	146.9	1.050	211,582	222,174.1						
3/22/2010	127.2	1.048	183,216	192,031.0						
3/23/2010	118.6	1.048	170,785	178,974.4						
3/24/2010	127.0	1.038	182,852	189,743.5						
3/25/2010	142.2	1.039	204,840	212,905.4						
3/26/2010	123.0	1.033	177,113	183,006.3						
3/27/2010	122.9	1.033	177,025	182,849.5						
3/28/2010	68.8	1.049	99,051	103,879.1						
3/29/2010	78.0	1.049	112,386	117,881.9						
3/30/2010	137.1	1.053	197,473	207,961.8						
3/31/2010	104.4	1.057	150,396	158,977.5	4,424,044	4,615,950	1.043	12,732,137	13,295,734	1.044

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2010	70.4	1.055	101,363	106,955.1						
4/2/2010	87.9	1.045	126,622	132,260.1						
4/3/2010	0.0	1.048	14	14.2						
4/4/2010	0.0	1.048	14	14.2						
4/5/2010	0.0	1.047	14	14.2						
4/6/2010	0.0	1.047	14	14.2						
4/7/2010	0.0	1.047	14	14.2						
4/8/2010	0.0	1.047	14	14.2						
4/9/2010	127.8	1.042	183,971	191,739.3						
4/10/2010	141.7	1.050	204,075	214,258.2						
4/11/2010	122.8	1.049	176,853	185,472.7						
4/12/2010	7.9	1.047	11,359	11,889.1						
4/13/2010	82.4	1.053	118,600	124,848.6						
4/14/2010	135.0	1.072	194,443	208,352.0						
4/15/2010	55.9	1.047	80,528	84,309.9						
4/16/2010	0.0	1.047	14	14.2						
4/17/2010	0.0	1.046	14	14.1						
4/18/2010	0.0	1.044	14	14.1						
4/19/2010	67.6	1.007	97,277	97,973.0						
4/20/2010	121.7	1.064	175,256	186,455.9						
4/21/2010	138.8	1.062	199,865	212,256.6						
4/22/2010	124.3	1.049	179,037	187,876.1						
4/23/2010	141.5	1.053	203,724	214,618.0						
4/24/2010	140.4	1.053	202,176	212,893.1						
4/25/2010	133.4	1.049	192,094	201,477.4						
4/26/2010	115.0	1.039	165,585	172,008.8						
4/27/2010	74.3	1.039	107,057	111,210.7						
4/28/2010	140.0	1.071	201,579	215,839.2						
4/29/2010	137.2	1.080	197,602	213,476.1						
4/30/2010	12.3	1.083	17,701	19,177.0	3,136,887	3,305,474	1.054	12,481,864	13,058,348	1.046
5/1/2010	0.0	1.081	14	14.6						
5/2/2010	0.0	1.082	14	14.6						
5/3/2010	0.0	1.082	14	14.6						
5/4/2010	0.0	1.082	14	14.6						
5/5/2010	139.0	1.057	200,172	211,619.8						
5/6/2010	81.4	1.046	117,214	122,565.2						
5/7/2010	0.0	1.043	14	15.0						
5/8/2010	0.0	1.041	14	14.1						
5/9/2010	0.0	1.043	15	15.4						
5/10/2010	143.6	1.050	206,844	217,190.3						
5/11/2010	144.3	1.047	207,845	217,593.2						
5/12/2010	143.1	1.045	205,999	215,345.8						
5/13/2010	10.6	1.042	15,260	15,908.0						
5/14/2010	115.2	1.044	165,856	173,094.3						
5/15/2010	148.8	1.032	214,341	221,149.4						
5/16/2010	155.3	1.055	223,658	235,918.3						
5/17/2010	128.5	1.046	185,066	193,639.2						
5/18/2010	79.2	1.038	114,107	118,396.4						
5/19/2010	0.0	1.039	14	14.1						
5/20/2010	141.2	1.047	203,398	212,894.1						
5/21/2010	40.9	1.043	58,870	61,429.6						
5/22/2010	133.9	1.052	192,752	202,846.7						
5/23/2010	145.5	1.046	209,556	219,189.3						
5/24/2010	144.7	1.042	208,436	217,180.9						
5/25/2010	137.9	1.061	198,613	210,648.2						
5/26/2010	136.7	1.059	196,827	208,442.5						
5/27/2010	140.5	1.066	202,324	215,691.3						
5/28/2010	130.7	1.076	188,242	202,579.8						
5/29/2010	131.9	1.061	189,866	201,427.7						
5/30/2010	48.4	1.063	69,686	74,068.5						
5/31/2010	99.0	1.083	142,582	154,412.8	3,917,624	4,123,348	1.053	11,478,555	12,044,772	1.049

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2010	136.5	1.072	196,505	210,731.2						
6/2/2010	122.8	1.067	176,886	188,729.6						
6/3/2010	28.7	1.062	41,392	43,948.8						
6/4/2010	130.0	1.066	187,229	199,499.9						
6/5/2010	35.9	1.070	51,628	55,218.3						
6/6/2010	22.0	1.069	31,723	33,927.7						
6/7/2010	41.8	1.049	60,261	63,230.0						
6/8/2010	31.4	1.039	45,157	46,929.0						
6/9/2010	23.3	1.035	33,551	34,731.0						
6/10/2010	157.4	1.049	226,716	237,903.9						
6/11/2010	48.3	1.019	69,579	70,887.3						
6/12/2010	61.1	1.014	88,034	89,243.8						
6/13/2010	96.4	1.059	138,792	146,957.5						
6/14/2010	0.0	1.038	14	14.0						
6/15/2010	37.0	1.040	53,297	55,405.6						
6/16/2010	61.3	1.034	88,278	91,298.4						
6/17/2010	50.0	1.036	71,932	74,506.5						
6/18/2010	0.0	1.107	14	15.0						
6/19/2010	10.3	1.035	14,766	15,287.0						
6/20/2010	146.0	1.040	210,292	218,680.3						
6/21/2010	38.7	1.026	55,721	57,152.1						
6/22/2010	80.4	1.023	115,771	118,469.2						
6/23/2010	76.1	1.012	109,646	110,974.0						
6/24/2010	30.7	1.013	44,151	44,733.2						
6/25/2010	159.0	1.038	228,986	237,648.9						
6/26/2010	53.0	1.053	76,386	80,418.6						
6/27/2010	115.8	1.072	166,733	178,704.0						
6/28/2010	2.4	1.083	3,420	3,702.3						
6/29/2010	28.0	1.076	40,337	43,421.1						
6/30/2010	118.3	1.059	170,343	180,354.5	2,797,540	2,932,723	1.048	9,852,051	10,361,545	1.052
7/1/2010	79.2	1.076	114,104	122,774.3						
7/2/2010	57.1	1.014	82,182	83,329.1						
7/3/2010	105.9	1.056	152,515	161,000.7						
7/4/2010	97.1	1.006	139,798	140,630.2						
7/5/2010	69.8	1.006	100,555	101,110.8						
7/6/2010	60.2	1.010	86,665	87,521.7						
7/7/2010	186.8	1.037	268,976	278,974.8						
7/8/2010	200.0	1.044	287,993	300,727.4						
7/9/2010	152.0	1.011	218,914	221,243.9						
7/10/2010	163.3	1.004	235,173	236,090.8						
7/11/2010	140.9	1.005	202,868	203,853.3						
7/12/2010	123.7	1.003	178,109	178,590.6						
7/13/2010	154.1	1.004	221,869	222,816.4						
7/14/2010	146.4	1.003	210,858	211,469.3						
7/15/2010	150.7	1.005	217,016	218,172.1						
7/16/2010	149.5	1.039	215,266	223,605.8						
7/17/2010	150.0	1.019	216,058	220,254.6						
7/18/2010	150.9	1.025	217,324	222,837.5						
7/19/2010	162.4	1.022	233,825	238,871.4						
7/20/2010	158.5	1.004	228,180	229,147.3						
7/21/2010	123.4	1.021	177,757	181,478.8						
7/22/2010	150.5	1.020	216,751	221,068.0						
7/23/2010	165.0	1.031	237,559	244,857.8						
7/24/2010	158.4	1.031	228,151	235,242.2						
7/25/2010	153.9	1.025	221,643	227,266.5						
7/26/2010	131.9	1.034	189,895	196,432.1						
7/27/2010	94.2	1.034	135,668	140,213.1						
7/28/2010	149.3	1.035	214,964	222,447.7						
7/29/2010	145.7	1.033	209,739	216,625.2						
7/30/2010	114.6	1.035	164,995	170,841.0						
7/31/2010	159.0	1.042	228,952	238,666.5	6,054,322	6,198,161	1.024	12,769,487	13,254,232	1.038

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2010	150.1	1.044	216,085	225,685.9						
8/2/2010	150.1	1.035	216,103	223,725.6						
8/3/2010	150.1	1.037	216,085	224,004.9						
8/4/2010	150.0	1.039	215,999	224,391.6						
8/5/2010	147.7	1.048	212,724	222,915.1						
8/6/2010	107.8	1.039	155,201	161,267.1						
8/7/2010	0.0	1.036	14	14.0						
8/8/2010	139.3	1.045	200,548	209,531.4						
8/9/2010	151.8	1.052	218,652	230,048.1						
8/10/2010	151.7	1.051	218,394	229,637.5						
8/11/2010	144.9	1.054	208,722	220,091.3						
8/12/2010	152.6	1.052	219,718	231,179.6						
8/13/2010	123.0	1.047	177,122	185,387.5						
8/14/2010	158.1	1.051	227,706	239,391.4						
8/15/2010	25.8	1.054	37,169	39,190.4						
8/16/2010	92.0	1.047	132,449	138,675.5						
8/17/2010	86.1	1.048	123,948	129,847.0						
8/18/2010	91.8	1.055	132,212	139,547.3						
8/19/2010	0.0	1.054	14	14.3						
8/20/2010	137.5	1.056	198,021	209,131.1						
8/21/2010	18.2	1.070	26,148	27,982.8						
8/22/2010	160.7	1.062	231,427	245,668.1						
8/23/2010	55.8	1.061	80,395	85,304.4						
8/24/2010	22.0	1.040	31,643	32,903.6						
8/25/2010	39.0	1.037	56,191	58,264.3						
8/26/2010	119.0	1.036	171,423	177,568.1						
8/27/2010	9.6	1.017	13,878	14,109.7						
8/28/2010	117.8	1.053	169,571	178,514.4						
8/29/2010	68.4	1.077	98,479	106,051.6						
8/30/2010	71.4	1.099	102,779	112,974.3						
8/31/2010	74.7	1.102	107,570	118,489.8	4,416,389	4,641,508	1.051	13,268,251	13,772,391	1.038
9/1/2010	84.0	1.058	120,954	127,953.9						
9/2/2010	120.2	1.048	173,120	181,495.3						
9/3/2010	50.3	1.052	72,394	76,166.5						
9/4/2010	119.5	1.042	172,096	179,243.3						
9/5/2010	150.5	1.048	216,738	227,097.2						
9/6/2010	145.8	1.047	209,940	219,721.0						
9/7/2010	39.2	1.048	56,410	59,139.5						
9/8/2010	109.7	1.039	158,000	164,191.4						
9/9/2010	102.8	1.015	148,084	150,248.7						
9/10/2010	9.7	1.006	13,981	14,065.4						
9/11/2010	81.4	1.008	117,248	118,131.2						
9/12/2010	111.3	1.018	160,266	163,101.0						
9/13/2010	0.0	1.016	14	13.7						
9/14/2010	134.0	1.021	193,002	197,087.3						
9/15/2010	150.0	1.061	216,053	229,337.3						
9/16/2010	165.9	1.061	238,934	253,498.1						
9/17/2010	122.9	1.044	176,915	184,712.8						
9/18/2010	70.3	1.041	101,208	105,310.7						
9/19/2010	131.7	1.028	189,668	194,961.6						
9/20/2010	53.1	1.080	76,406	82,504.3						
9/21/2010	87.7	1.039	126,274	131,214.3						
9/22/2010	103.7	1.040	149,357	155,397.4						
9/23/2010	88.8	1.044	127,854	133,482.8						
9/24/2010	87.3	1.038	125,725	130,544.9						
9/25/2010	20.8	1.038	29,934	31,063.7						
9/26/2010	58.1	1.035	83,716	86,611.0						
9/27/2010	133.0	1.034	191,468	197,917.9						
9/28/2010	33.3	1.036	47,995	49,740.2						
9/29/2010	133.7	1.030	192,577	198,374.4						
9/30/2010	105.3	1.033	151,677	156,670.1	4,038,009	4,198,997	1.040	14,508,719	15,038,665	1.037

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2010	106.0	1.036	152,696	158,145.4						
10/2/2010	93.4	1.037	134,482	139,454.4						
10/3/2010	67.4	1.042	97,097	101,165.8						
10/4/2010	91.8	1.041	132,179	137,634.7						
10/5/2010	139.5	1.054	200,816	211,640.2						
10/6/2010	24.0	1.043	34,622	36,107.8						
10/7/2010	99.9	1.047	143,926	150,661.4						
10/8/2010	112.3	1.048	161,706	169,532.8						
10/9/2010	17.8	1.045	25,596	26,748.0						
10/10/2010	126.3	1.041	181,907	189,384.9						
10/11/2010	60.8	1.041	87,490	91,050.1						
10/12/2010	91.6	1.047	131,949	138,192.2						
10/13/2010	27.0	1.047	38,923	40,768.5						
10/14/2010	100.4	1.050	144,526	151,791.1						
10/15/2010	0.0	1.052	14	14.2						
10/16/2010	0.0	1.052	14	14.2						
10/17/2010	0.0	1.050	14	14.2						
10/18/2010	0.0	1.052	14	14.2						
10/19/2010	22.9	1.052	33,009	34,719.0						
10/20/2010	79.4	1.049	114,335	119,927.6						
10/21/2010	27.4	1.047	39,413	41,249.6						
10/22/2010	0.0	1.044	218,822	228,485.2						
10/23/2010	0.0	1.021	41,820	42,718.1						
10/24/2010	125.9	1.041	181,224	188,654.2						
10/25/2010	34.1	1.032	49,163	50,752.9						
10/26/2010	150.0	1.042	216,032	225,178.7						
10/27/2010	0.0	1.033	19,071	19,704.5						
10/28/2010	0.0	1.030	159,158	163,959.7						
10/29/2010	10.3	1.043	14,791	15,428.7						
10/30/2010	76.2	1.042	109,695	114,326.1						
10/31/2010	41.9	1.060	60,310	63,935.1	2,924,814	3,051,374	1.043	11,379,211	11,891,878	1.045
11/1/2010	132.6	1.056	190,881	201,511.8						
11/2/2010	27.3	1.070	39,316	42,072.3						
11/3/2010	134.5	1.062	193,750	205,702.3						
11/4/2010	11.3	1.031	16,248	16,752.1						
11/5/2010	140.6	1.029	202,511	208,416.3						
11/6/2010	27.6	1.033	39,807	41,127.5						
11/7/2010	141.4	1.041	203,546	211,925.4						
11/8/2010	0.0	1.045	14	14.1						
11/9/2010	108.9	1.048	156,745	164,253.2						
11/10/2010	68.2	1.050	98,259	103,188.0						
11/11/2010	32.9	1.051	47,356	49,784.1						
11/12/2010	101.4	1.050	146,085	153,397.1						
11/13/2010	36.7	1.046	52,847	55,289.2						
11/14/2010	25.9	1.046	37,299	39,030.4						
11/15/2010	131.6	1.048	189,469	198,635.4						
11/16/2010	26.0	1.045	37,433	39,129.3						
11/17/2010	116.3	1.035	167,516	173,301.1						
11/18/2010	38.6	1.034	55,631	57,499.0						
11/19/2010	129.2	1.031	185,979	191,764.9						
11/20/2010	63.3	1.030	91,198	93,895.9						
11/21/2010	95.9	1.030	138,108	142,200.8						
11/22/2010	70.4	1.028	101,374	104,228.6						
11/23/2010	62.8	1.045	90,444	94,486.0						
11/24/2010	83.9	1.046	120,856	126,447.2						
11/25/2010	45.1	1.051	64,980	68,311.5						
11/26/2010	12.1	1.051	17,400	18,288.4						
11/27/2010	53.5	1.048	77,092	80,821.9						
11/28/2010	115.9	1.035	166,960	172,840.0						
11/29/2010	17.4	1.032	25,108	25,919.5						
11/30/2010	85.8	1.026	123,507	126,685.1	3,077,717	3,206,918	1.042	10,040,539	10,457,289	1.042

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2010	62.2	1.028	89,525	92,065.8						
12/2/2010	108.4	1.031	156,042	160,928.5						
12/3/2010	0.4	1.031	529	544.7						
12/4/2010	0.0	1.027	14	13.9						
12/5/2010	0.0	1.026	14	13.9						
12/6/2010	0.0	1.027	14	13.9						
12/7/2010	20.3	1.026	29,196	29,963.1						
12/8/2010	147.5	1.027	212,400	218,158.3						
12/9/2010	1.3	1.026	1,830	1,877.3						
12/10/2010	102.9	1.028	148,139	152,217.3						
12/11/2010	60.7	1.034	87,439	90,389.6						
12/12/2010	35.2	1.033	50,657	52,309.7						
12/13/2010	161.1	1.032	231,995	239,432.6						
12/14/2010	0.0	1.028	14	13.9						
12/15/2010	2.7	1.025	3,953	4,052.0						
12/16/2010	166.8	1.028	240,125	246,950.6						
12/17/2010	3.2	1.030	4,564	4,701.4						
12/18/2010	51.3	1.031	73,944	76,220.8						
12/19/2010	89.8	1.038	129,335	134,243.7						
12/20/2010	160.3	1.041	230,789	240,228.2						
12/21/2010	96.7	1.066	139,300	148,450.9						
12/22/2010	75.0	1.050	107,976	113,402.9						
12/23/2010	70.0	1.066	100,771	107,374.8						
12/24/2010	115.6	1.065	166,490	177,251.3						
12/25/2010	43.2	1.061	62,205	66,009.3						
12/26/2010	105.6	1.058	152,083	160,848.3						
12/27/2010	92.3	1.061	132,874	140,938.4						
12/28/2010	160.0	1.047	230,389	241,180.3						
12/29/2010	68.4	1.047	98,432	103,089.3						
12/30/2010	178.1	1.039	256,421	266,409.4						
12/31/2010	155.9	1.044	224,535	234,476.1	3,361,990	3,503,770	1.042	9,364,521	9,762,062	1.042
1/1/2011	164.9	1.036	237,464	246,127.3						
1/2/2011	82.4	1.030	118,597	122,161.7						
1/3/2011	87.9	1.026	126,511	129,814.4						
1/4/2011	165.6	1.031	238,413	245,854.7						
1/5/2011	156.1	1.074	224,856	241,460.6						
1/6/2011	154.0	1.034	221,816	229,369.5						
1/7/2011	48.8	1.031	70,266	72,444.6						
1/8/2011	152.2	1.035	219,190	226,966.6						
1/9/2011	159.5	1.048	229,735	240,848.6						
1/10/2011	160.1	1.056	230,560	243,387.8						
1/11/2011	131.8	1.045	189,776	198,365.9						
1/12/2011	108.3	1.047	155,949	163,255.4						
1/13/2011	165.0	1.043	237,536	247,649.4						
1/14/2011	84.7	1.043	121,923	127,152.3						
1/15/2011	95.5	1.038	137,547	142,817.5						
1/16/2011	157.1	1.037	226,275	234,694.8						
1/17/2011	25.7	1.038	37,007	38,396.0						
1/18/2011	158.6	1.045	228,394	238,564.8						
1/19/2011	159.5	1.040	229,640	238,790.3						
1/20/2011	0.0	1.031	14	13.9						
1/21/2011	73.8	0.000	106,250	0.0						
1/22/2011	61.6	1.053	88,772	93,519.2						
1/23/2011	0.0	1.066	14	14.4						
1/24/2011	92.8	1.065	133,645	142,367.7						
1/25/2011	129.9	1.054	187,026	197,186.6						
1/26/2011	20.5	1.055	29,580	31,209.0						
1/27/2011	79.7	1.055	114,829	121,109.4						
1/28/2011	20.5	1.034	29,533	30,529.9						
1/29/2011	99.9	1.034	143,798	148,625.7						
1/30/2011	47.4	1.036	68,193	70,630.8						
1/31/2011	20.4	1.036	29,366	30,420.2	4,412,474	4,493,749	1.018	10,852,181	11,204,437	1.032

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2011	94.4	1.040	135,932	141,384.1						
2/2/2011	0.0	1.039	0	0.0						
2/3/2011	94.4	1.044	135,973	141,893.6						
2/4/2011	27.9	1.033	40,196	41,520.1						
2/5/2011	85.2	1.054	122,682	129,255.6						
2/6/2011	81.0	1.020	116,606	118,896.2						
2/7/2011	85.1	1.025	122,572	125,623.5						
2/8/2011	51.3	1.031	73,911	76,202.0						
2/9/2011	111.1	1.031	160,045	164,930.7						
2/10/2011	158.3	1.031	227,986	235,051.9						
2/11/2011	23.0	1.027	33,184	34,071.0						
2/12/2011	166.2	1.029	239,301	246,329.4						
2/13/2011	4.7	1.023	6,715	6,871.6						
2/14/2011	43.9	1.026	63,231	64,875.7						
2/15/2011	139.1	1.028	200,339	205,928.7						
2/16/2011	0.0	1.024	0	0.0						
2/17/2011	99.2	1.024	142,846	146,267.8						
2/18/2011	154.2	1.029	222,119	228,585.7						
2/19/2011	192.9	1.006	277,775	279,485.8						
2/20/2011	204.9	1.004	295,088	296,315.7						
2/21/2011	200.1	1.105	288,088	318,323.6						
2/22/2011	199.4	1.005	287,165	288,724.3						
2/23/2011	170.0	1.006	244,870	246,327.5						
2/24/2011	203.1	1.008	292,416	294,664.8						
2/25/2011	192.5	1.006	277,244	278,907.8						
2/26/2011	164.2	1.041	236,455	246,139.1						
2/27/2011	156.3	1.106	225,081	248,941.1						
2/28/2011	162.4	1.122	233,832	262,360.7	4,701,651	4,867,878	1.035	12,476,114	12,865,397	1.031
3/1/2011	72.2	1.007	104,033	104,789.6						
3/2/2011	0.0	1.007	0	0.0						
3/3/2011	0.0	1.007	0	0.0						
3/4/2011	53.6	1.007	77,218	77,730.8						
3/5/2011	180.2	1.109	259,531	287,725.0						
3/6/2011	182.2	1.129	262,436	296,414.9						
3/7/2011	184.5	1.130	265,625	300,212.2						
3/8/2011	194.3	1.006	279,775	281,572.5						
3/9/2011	171.0	1.028	246,258	253,244.2						
3/10/2011	165.1	1.088	237,702	258,571.4						
3/11/2011	127.9	1.132	184,174	208,456.9						
3/12/2011	0.0	1.053	0	0.0						
3/13/2011	0.0	1.048	0	0.0						
3/14/2011	0.0	1.054	3	3.4						
3/15/2011	0.0	1.053	0	0.0						
3/16/2011	115.4	1.055	166,134	175,281.0						
3/17/2011	172.8	1.145	248,879	284,956.7						
3/18/2011	165.0	1.047	237,579	248,687.5						
3/19/2011	63.0	1.047	90,788	95,088.9						
3/20/2011	0.0	1.046	0	0.0						
3/21/2011	0.0	1.147	0	0.0						
3/22/2011	128.2	1.148	184,552	211,780.6						
3/23/2011	187.4	1.185	269,896	319,743.0						
3/24/2011	183.1	1.124	263,653	296,264.0						
3/25/2011	189.0	1.011	272,089	275,025.9						
3/26/2011	0.0	1.005	0	0.0						
3/27/2011	91.3	1.006	131,483	132,327.7						
3/28/2011	60.5	1.106	87,072	96,274.3						
3/29/2011	159.6	1.112	229,834	255,503.4						
3/30/2011	130.3	1.116	187,615	209,320.1						
3/31/2011	0.0	1.115	0	0.0	4,286,329	4,668,974	1.089	13,400,453	14,030,601	1.047

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2011	95.7	1.116	137,817	153,767.7						
4/2/2011	173.6	1.127	249,920	281,664.5						
4/3/2011	171.0	1.028	246,220	253,219.9						
4/4/2011	60.2	1.013	86,678	87,832.8						
4/5/2011	0.0	1.013	0	0.0						
4/6/2011	0.0	1.012	0	0.0						
4/7/2011	0.0	1.012	0	0.0						
4/8/2011	79.5	1.013	114,480	116,024.1						
4/9/2011	166.3	1.123	239,461	268,992.3						
4/10/2011	175.0	1.134	251,954	285,613.1						
4/11/2011	176.2	1.034	253,779	262,397.4						
4/12/2011	179.5	1.063	258,522	274,812.8						
4/13/2011	80.0	1.033	115,267	119,036.6						
4/14/2011	163.1	1.136	234,885	266,930.9						
4/15/2011	158.7	1.039	228,525	237,439.4						
4/16/2011	147.0	1.009	211,693	213,566.3						
4/17/2011	168.9	1.005	243,149	244,353.8						
4/18/2011	16.5	1.006	23,743	23,890.6						
4/19/2011	0.0	1.008	0	0.0						
4/20/2011	0.0	1.005	0	0.0						
4/21/2011	5.0	1.007	7,179	7,226.2						
4/22/2011	179.7	1.006	258,726	260,199.6						
4/23/2011	198.6	1.072	285,955	306,575.9						
4/24/2011	70.4	1.118	101,352	113,301.9						
4/25/2011	189.7	1.125	273,132	307,246.4						
4/26/2011	49.3	1.130	70,945	80,158.1						
4/27/2011	0.0	1.031	0	0.0						
4/28/2011	151.1	1.130	217,549	245,812.3						
4/29/2011	114.4	1.131	164,777	186,391.9						
4/30/2011	0.0	1.129	0	0.0	4,275,709	4,596,455	1.075	13,263,688	14,133,307	1.066
5/1/2011	0.0	1.131	0	0.0						
5/2/2011	0.0	1.125	0	0.0						
5/3/2011	87.5	1.125	126,017	141,769.5						
5/4/2011	190.4	1.132	274,214	310,458.1						
5/5/2011	17.8	1.018	25,562	26,025.4						
5/6/2011	176.9	1.010	254,743	257,226.3						
5/7/2011	180.5	1.118	259,926	290,651.9						
5/8/2011	174.5	1.131	251,279	284,263.1						
5/9/2011	190.6	1.007	274,521	276,444.2						
5/10/2011	136.7	1.111	196,894	218,794.6						
5/11/2011	0.0	1.122	0	0.0						
5/12/2011	174.3	1.126	250,957	282,647.5						
5/13/2011	147.0	1.135	211,669	240,146.4						
5/14/2011	0.0	1.082	0	0.0						
5/15/2011	148.8	1.127	214,318	241,458.4						
5/16/2011	9.7	1.134	13,911	15,776.8						
5/17/2011	0.0	1.134	0	0.0						
5/18/2011	0.0	1.030	0	0.0						
5/19/2011	59.4	1.130	85,503	96,586.9						
5/20/2011	155.0	1.007	223,198	224,834.3						
5/21/2011	167.7	1.007	241,463	243,259.3						
5/22/2011	206.9	1.119	297,980	333,331.1						
5/23/2011	195.9	1.137	282,043	320,617.9						
5/24/2011	176.4	1.136	253,985	288,586.4						
5/25/2011	94.8	1.041	136,470	142,000.9						
5/26/2011	0.0	1.013	0	0.0						
5/27/2011	0.0	1.014	0	0.0						
5/28/2011	0.0	1.015	0	0.0						
5/29/2011	32.4	1.019	46,590	47,480.1						
5/30/2011	164.4	1.137	236,802	269,219.9						
5/31/2011	18.3	1.141	26,339	30,059.0	4,184,383	4,581,638	1.095	12,746,420	13,847,067	1.086

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2011	0.0	1.142	0	0.0						
6/2/2011	149.0	1.142	214,497	244,903.0						
6/3/2011	157.1	1.151	226,154	260,401.2						
6/4/2011	92.9	1.013	133,759	135,499.0						
6/5/2011	122.2	1.135	175,994	199,701.6						
6/6/2011	54.7	1.027	78,783	80,943.4						
6/7/2011	174.6	1.113	251,374	279,714.8						
6/8/2011	128.6	1.147	185,201	212,466.0						
6/9/2011	209.0	1.020	301,023	307,078.0						
6/10/2011	84.9	1.005	122,327	122,881.7						
6/11/2011	53.9	1.077	77,566	83,510.7						
6/12/2011	80.6	1.095	116,106	127,149.7						
6/13/2011	118.3	1.105	170,368	188,248.7						
6/14/2011	183.5	1.131	264,235	298,739.6						
6/15/2011	115.9	1.133	166,861	189,134.0						
6/16/2011	181.9	1.129	261,999	295,866.4						
6/17/2011	135.8	1.131	195,573	221,265.2						
6/18/2011	0.0	1.131	0	0.0						
6/19/2011	153.3	1.132	220,801	249,866.8						
6/20/2011	80.0	1.138	115,137	131,047.7						
6/21/2011	108.5	1.102	156,298	172,170.7						
6/22/2011	145.2	1.133	209,146	236,864.5						
6/23/2011	149.9	1.062	215,814	229,127.7						
6/24/2011	25.5	1.008	36,785	37,066.2						
6/25/2011	180.1	1.108	259,384	287,372.2						
6/26/2011	111.8	1.138	160,933	183,117.3						
6/27/2011	98.6	1.020	142,002	144,827.5						
6/28/2011	102.6	1.133	147,762	167,383.7						
6/29/2011	171.4	1.136	246,882	280,458.2						
6/30/2011	112.6	1.142	162,073	185,160.4	5,014,839	5,551,966	1.107	13,474,930	14,730,059	1.093
7/1/2011	135.4	1.136	194,944	221,401.0						
7/2/2011	170.7	1.136	245,788	279,333.5						
7/3/2011	180.5	1.129	259,903	293,552.6						
7/4/2011	206.8	1.004	297,864	299,102.7						
7/5/2011	165.0	1.141	237,646	271,231.0						
7/6/2011	87.5	1.006	126,022	126,778.4						
7/7/2011	0.0	1.010	38	38.6						
7/8/2011	16.8	1.005	24,223	24,344.9						
7/9/2011	205.7	1.114	296,222	329,991.1						
7/10/2011	121.2	1.126	174,529	196,519.6						
7/11/2011	162.1	1.092	233,436	254,901.0						
7/12/2011	103.8	1.047	149,435	156,388.9						
7/13/2011	45.3	1.100	65,205	71,739.8						
7/14/2011	237.0	1.132	341,348	386,460.1						
7/15/2011	142.3	1.042	204,960	213,592.0						
7/16/2011	187.7	1.045	270,270	282,321.5						
7/17/2011	111.6	1.143	160,709	183,707.0						
7/18/2011	0.0	1.144	1	1.2						
7/19/2011	70.7	1.143	101,819	116,429.0						
7/20/2011	194.2	1.143	279,666	319,736.0						
7/21/2011	187.6	1.003	270,158	271,068.3						
7/22/2011	0.0	1.007	0	0.0						
7/23/2011	3.5	1.008	5,086	5,124.2						
7/24/2011	184.9	1.018	266,252	270,963.2						
7/25/2011	0.0	1.113	0	0.0						
7/26/2011	0.0	1.110	4	4.3						
7/27/2011	1.4	1.111	1,956	2,174.3						
7/28/2011	171.4	1.112	246,852	274,605.3						
7/29/2011	216.1	1.112	311,252	346,018.0						
7/30/2011	173.3	1.110	249,492	276,821.1						
7/31/2011	185.8	1.004	267,571	268,527.5	5,282,650	5,742,876	1.087	14,481,871	15,876,480	1.096

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2011	195.2	1.007	281,028	282,960.2						
8/2/2011	108.5	1.138	156,185	177,783.5						
8/3/2011	184.7	1.009	265,913	268,327.5						
8/4/2011	113.6	1.126	163,583	184,193.9						
8/5/2011	0.0	1.012	3	2.7						
8/6/2011	1.3	1.012	1,850	1,871.9						
8/7/2011	0.0	1.013	0	0.0						
8/8/2011	0.0	1.013	2	1.7						
8/9/2011	31.6	1.014	45,504	46,142.2						
8/10/2011	218.0	1.034	313,912	324,458.6						
8/11/2011	206.0	1.033	296,693	306,470.6						
8/12/2011	212.8	1.109	306,410	339,939.1						
8/13/2011	216.7	1.008	312,000	314,560.6						
8/14/2011	0.0	1.102	14	15.7						
8/15/2011	113.9	1.006	163,962	164,886.1						
8/16/2011	77.6	1.128	111,737	126,053.4						
8/17/2011	180.2	1.008	259,501	261,491.5						
8/18/2011	114.9	1.137	165,424	188,124.7						
8/19/2011	197.1	1.154	283,839	327,606.7						
8/20/2011	161.5	1.134	232,503	263,559.8						
8/21/2011	0.0	1.047	0	0.0						
8/22/2011	0.0	1.047	0	0.0						
8/23/2011	0.0	1.048	0	0.0						
8/24/2011	0.0	1.049	0	0.0						
8/25/2011	0.0	1.048	0	0.0						
8/26/2011	0.0	1.050	49	51.5						
8/27/2011	5.6	1.050	8,073	8,476.8						
8/28/2011	231.9	1.097	333,944	366,442.5						
8/29/2011	233.8	1.114	336,601	375,116.3						
8/30/2011	227.5	1.007	327,543	329,682.0						
8/31/2011	0.0	1.008	0	0.0	4,366,272	4,658,219	1.067	14,663,760	15,953,062	1.088
9/1/2011	0.0	1.006	0	0.0						
9/2/2011	0.0	1.009	0	0.0						
9/3/2011	60.2	1.007	86,715	87,358.8						
9/4/2011	130.5	1.091	187,882	204,901.8						
9/5/2011	239.1	1.128	344,338	388,306.7						
9/6/2011	67.0	1.129	96,462	108,933.3						
9/7/2011	159.5	1.130	229,636	259,513.1						
9/8/2011	127.2	1.138	183,137	208,391.4						
9/9/2011	70.2	1.008	101,065	101,837.1						
9/10/2011	234.6	1.124	337,769	379,813.3						
9/11/2011	0.0	1.127	2	2.4						
9/12/2011	10.0	1.137	14,355	16,318.3						
9/13/2011	123.1	1.136	177,197	201,325.4						
9/14/2011	53.4	1.136	76,915	87,379.6						
9/15/2011	116.3	1.134	167,476	189,909.3						
9/16/2011	237.0	1.131	341,214	386,021.4						
9/17/2011	242.3	1.125	348,916	392,567.8						
9/18/2011	244.8	1.005	352,475	354,256.5						
9/19/2011	114.2	1.006	164,389	165,335.3						
9/20/2011	0.0	1.007	0	0.0						
9/21/2011	0.0	1.007	0	0.0						
9/22/2011	0.0	1.006	0	0.0						
9/23/2011	184.4	1.052	265,567	279,264.3						
9/24/2011	227.5	1.129	327,562	369,785.3						
9/25/2011	100.0	1.007	143,928	144,915.1						
9/26/2011	0.0	1.006	0	0.0						
9/27/2011	0.0	1.008	0	0.0						
9/28/2011	0.0	1.008	0	0.0						
9/29/2011	0.0	1.008	0	0.0						
9/30/2011	0.0	1.007	0	0.5	3,947,002	4,326,137	1.096	13,595,923	14,727,232	1.083

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2011	0.0	1.006	0	0.0						
10/2/2011	0.0	1.007	0	0.1						
10/3/2011	131.3	1.008	189,061	190,664.8						
10/4/2011	255.3	1.134	367,645	416,870.9						
10/5/2011	217.3	1.031	312,843	322,465.2						
10/6/2011	234.7	1.008	338,012	340,866.0						
10/7/2011	247.6	1.117	356,583	398,381.1						
10/8/2011	18.1	1.118	26,099	29,185.5						
10/9/2011	0.0	1.117	0	0.0						
10/10/2011	206.7	1.008	297,642	300,171.4						
10/11/2011	224.3	1.004	323,049	324,409.6						
10/12/2011	236.5	1.003	340,614	341,500.6						
10/13/2011	241.4	1.004	347,667	349,195.9						
10/14/2011	87.3	1.008	125,745	126,692.2						
10/15/2011	0.0	1.006	0	0.0						
10/16/2011	0.0	1.008	0	0.0						
10/17/2011	0.0	1.009	0	0.0						
10/18/2011	0.0	1.007	0	0.0						
10/19/2011	193.6	1.124	278,753	313,381.2						
10/20/2011	235.9	1.124	339,648	381,769.6						
10/21/2011	17.3	1.120	24,947	27,930.6						
10/22/2011	0.0	1.200	0	0.0						
10/23/2011	0.0	1.120	159,780	178,978.9						
10/24/2011	240.5	1.128	346,311	390,638.9						
10/25/2011	71.9	1.007	103,533	104,236.4						
10/26/2011	0.0	1.007	0	0.0						
10/27/2011	0.0	1.129	191,843	216,664.9						
10/28/2011	0.0	1.150	362,132	416,286.5						
10/29/2011	94.1	1.152	135,488	156,034.9						
10/30/2011	0.0	1.148	0	0.0						
10/31/2011	25.5	1.150	36,740	42,253.0	5,004,134	5,368,578	1.073	13,317,407	14,352,934	1.078
11/1/2011	177.9	1.148	256,222	294,078.8						
11/2/2011	184.2	1.031	265,184	273,448.8						
11/3/2011	215.4	1.096	310,125	339,751.2						
11/4/2011	10.1	1.145	14,552	16,660.2						
11/5/2011	0.1	1.145	107	122.5						
11/6/2011	0.1	1.145	114	130.4						
11/7/2011	0.0	1.145	0	0.0						
11/8/2011	0.0	1.144	0	0.0						
11/9/2011	188.7	1.144	271,762	310,924.5						
11/10/2011	235.4	1.125	338,973	381,309.0						
11/11/2011	219.6	1.116	316,242	352,994.8						
11/12/2011	242.2	1.121	348,754	390,844.5						
11/13/2011	242.9	1.141	349,714	398,915.4						
11/14/2011	238.8	1.131	343,906	388,978.5						
11/15/2011	68.7	1.127	98,921	111,511.3						
11/16/2011	28.7	1.133	41,383	46,885.3						
11/17/2011	209.1	1.138	301,162	342,612.8						
11/18/2011	232.9	1.006	335,370	337,277.9						
11/19/2011	131.0	1.130	188,639	213,153.9						
11/20/2011	9.0	1.007	12,905	12,994.5						
11/21/2011	230.1	1.084	331,277	358,983.7						
11/22/2011	24.2	1.132	34,800	39,382.9						
11/23/2011	0.0	1.131	0	0.0						
11/24/2011	0.0	1.131	0	0.0						
11/25/2011	220.0	1.131	316,838	358,477.8						
11/26/2011	271.5	1.117	390,977	436,827.3						
11/27/2011	265.0	1.045	381,650	398,844.7						
11/28/2011	220.7	1.005	317,834	319,473.6						
11/29/2011	19.4	1.004	27,969	28,093.8						
11/30/2011	239.8	1.058	345,313	365,179.0	5,940,693	6,517,857	1.097	14,891,828	16,212,572	1.089

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2011	3.0	1.098	4,320	4,743.1						
12/2/2011	0.0	1.098	0	0.0						
12/3/2011	167.5	1.097	241,224	264,725.4						
12/4/2011	105.2	1.006	151,505	152,478.3						
12/5/2011	256.0	1.121	368,636	413,126.0						
12/6/2011	256.5	1.102	369,349	407,129.7						
12/7/2011	161.1	1.041	231,941	241,398.0						
12/8/2011	248.1	1.121	357,322	400,406.1						
12/9/2011	109.5	1.125	157,652	177,424.4						
12/10/2011	259.7	1.124	373,998	420,416.1						
12/11/2011	163.4	1.070	235,246	251,727.8						
12/12/2011	184.0	1.028	265,020	272,386.6						
12/13/2011	72.0	1.109	103,672	114,928.9						
12/14/2011	100.7	1.112	145,064	161,265.9						
12/15/2011	244.7	1.123	352,304	395,786.9						
12/16/2011	192.0	1.007	276,449	278,501.2						
12/17/2011	43.0	1.113	61,855	68,828.3						
12/18/2011	264.9	1.118	381,418	426,442.8						
12/19/2011	60.3	1.015	86,864	88,194.3						
12/20/2011	61.2	1.008	88,145	88,841.1						
12/21/2011	233.6	1.081	336,394	363,781.4						
12/22/2011	233.5	1.014	336,306	340,925.4						
12/23/2011	230.9	1.085	332,539	360,699.3						
12/24/2011	242.3	1.011	348,918	352,758.6						
12/25/2011	231.5	1.120	333,408	373,525.6						
12/26/2011	14.4	1.004	20,682	20,770.2						
12/27/2011	151.3	1.004	217,853	218,714.6						
12/28/2011	179.5	1.005	258,476	259,730.9						
12/29/2011	0.0	1.005	0	0.0						
12/30/2011	0.0	1.005	0	0.0						
12/31/2011	0.0	1.006	0	0.0	6,436,559	6,919,657	1.075	17,381,386	18,806,092	1.082
1/1/2012	0.0	1.005	0	0.0						
1/2/2012	0.0	1.006	0	0.0						
1/3/2012	46.0	1.006	66,239	66,627.2						
1/4/2012	224.0	1.090	322,563	351,696.5						
1/5/2012	229.2	1.006	330,092	332,039.4						
1/6/2012	168.8	1.015	243,139	246,901.9						
1/7/2012	228.6	1.106	329,128	363,913.5						
1/8/2012	0.0	1.120	0	0.0						
1/9/2012	59.1	1.121	85,152	95,451.5						
1/10/2012	240.9	1.005	346,859	348,522.0						
1/11/2012	223.6	1.010	321,927	325,300.3						
1/12/2012	235.1	1.082	338,576	366,180.1						
1/13/2012	191.3	1.044	275,427	287,431.2						
1/14/2012	249.8	1.067	359,730	383,681.5						
1/15/2012	241.4	1.026	347,592	356,484.5						
1/16/2012	26.8	1.012	38,630	39,081.4						
1/17/2012	0.0	1.012	0	0.0						
1/18/2012	44.0	1.004	63,378	63,650.9						
1/19/2012	242.4	1.096	349,056	382,713.8						
1/20/2012	263.0	1.014	378,726	384,149.1						
1/21/2012	142.8	1.009	205,646	207,572.9						
1/22/2012	266.1	1.111	383,253	425,935.8						
1/23/2012	131.1	1.012	188,799	191,016.0						
1/24/2012	55.5	1.006	79,965	80,432.7						
1/25/2012	158.4	1.094	228,110	249,643.8						
1/26/2012	144.5	1.112	208,097	231,327.7						
1/27/2012	255.1	1.118	367,331	410,715.2						
1/28/2012	241.4	1.005	347,565	349,431.5						
1/29/2012	191.0	1.103	275,110	303,506.2						
1/30/2012	0.0	1.008	11	11.4						
1/31/2012	0.0	1.011	0	0.0	6,480,101	6,843,418	1.056	18,857,353	20,280,932	1.075

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2012	0.0	1.011	8	8.3						
2/2/2012	107.2	1.010	154,422	156,034.5						
2/3/2012	237.6	1.122	342,097	383,890.2						
2/4/2012	179.7	1.012	258,697	261,748.4						
2/5/2012	252.0	1.003	362,938	363,932.8						
2/6/2012	239.6	1.002	344,973	345,824.8						
2/7/2012	223.4	1.115	321,740	358,606.5						
2/8/2012	0.0	1.013	0	0.0						
2/9/2012	94.7	1.013	136,379	138,102.4						
2/10/2012	131.9	1.134	190,000	215,429.0						
2/11/2012	184.8	1.137	266,132	302,705.0						
2/12/2012	113.9	1.003	164,050	164,534.4						
2/13/2012	98.2	1.005	141,367	142,007.2						
2/14/2012	248.0	1.008	357,113	359,953.0						
2/15/2012	43.6	1.004	62,723	62,960.7						
2/16/2012	0.0	1.003	3	3.2						
2/17/2012	0.0	1.003	0	0.0						
2/18/2012	23.1	1.003	33,232	33,332.0						
2/19/2012	229.3	1.140	330,166	376,371.7						
2/20/2012	215.1	1.149	309,674	355,669.7						
2/21/2012	269.2	1.008	387,677	390,699.0						
2/22/2012	275.3	1.004	396,365	397,890.1						
2/23/2012	61.0	1.118	87,824	98,169.5						
2/24/2012	214.2	1.038	308,496	320,139.6						
2/25/2012	248.1	1.006	357,240	359,310.6						
2/26/2012	137.9	1.132	198,529	224,704.2						
2/27/2012	206.3	1.131	297,119	336,135.7						
2/28/2012	0.0	1.126	0	0.0						
2/29/2012	30.3	1.126	43,692	49,211.5	5,852,657	6,197,374	1.059	18,769,317	19,960,449	1.063
3/1/2012	233.1	1.261	335,619	423,128.7						
3/2/2012	246.6	1.083	355,084	384,483.6						
3/3/2012	26.1	1.060	37,552	39,819.4						
3/4/2012	0.0	1.057	0	0.0						
3/5/2012	0.0	1.057	0	0.0						
3/6/2012	0.0	1.058	0	0.0						
3/7/2012	83.3	1.058	119,888	126,822.8						
3/8/2012	268.3	1.122	386,308	433,420.2						
3/9/2012	165.3	1.008	238,019	239,887.0						
3/10/2012	234.4	1.088	337,547	367,235.5						
3/11/2012	266.1	1.005	383,119	384,996.6						
3/12/2012	256.0	1.003	368,613	369,835.8						
3/13/2012	233.3	1.002	336,010	336,560.2						
3/14/2012	239.3	1.131	344,618	389,600.8						
3/15/2012	256.2	1.113	368,963	410,714.5						
3/16/2012	16.5	1.096	23,807	26,089.4						
3/17/2012	0.0	1.095	0	0.0						
3/18/2012	0.0	1.096	0	0.0						
3/19/2012	0.0	1.097	0	0.0						
3/20/2012	140.1	1.095	201,754	220,857.5						
3/21/2012	249.2	1.060	358,845	380,451.9						
3/22/2012	257.2	1.091	370,363	404,163.9						
3/23/2012	254.2	1.103	365,982	403,619.8						
3/24/2012	226.5	1.105	326,202	360,487.7						
3/25/2012	257.0	1.005	370,134	372,141.9						
3/26/2012	35.7	1.104	51,369	56,717.3						
3/27/2012	39.6	1.030	57,050	58,738.3						
3/28/2012	138.6	1.087	199,603	216,992.4						
3/29/2012	259.7	1.124	374,023	420,228.5						
3/30/2012	267.3	1.103	384,892	424,535.6						
3/31/2012	244.2	1.006	351,714	353,695.9	7,047,078	7,605,225	1.079	19,379,836	20,646,017	1.065

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2012	0.0	1.004	0	0.0						
4/2/2012	0.0	1.005	0	0.0						
4/3/2012	0.0	1.006	0	0.0						
4/4/2012	0.0	1.006	0	0.0						
4/5/2012	0.0	1.005	0	0.0						
4/6/2012	56.0	1.055	80,707	85,129.3						
4/7/2012	238.1	1.107	342,882	379,533.7						
4/8/2012	93.2	1.006	134,238	135,021.6						
4/9/2012	250.5	1.077	360,703	388,383.7						
4/10/2012	219.1	1.016	315,545	320,578.7						
4/11/2012	133.9	1.124	192,861	216,746.3						
4/12/2012	18.1	1.019	26,101	26,585.5						
4/13/2012	236.6	1.120	340,769	381,777.1						
4/14/2012	170.0	1.051	244,808	257,376.3						
4/15/2012	0.1	1.006	137	138.0						
4/16/2012	0.1	1.006	128	128.9						
4/17/2012	9.2	1.007	13,213	13,299.4						
4/18/2012	203.9	1.071	293,676	314,496.2						
4/19/2012	227.9	1.038	328,208	340,784.4						
4/20/2012	85.5	1.004	123,157	123,631.3						
4/21/2012	75.0	1.096	107,931	118,309.5						
4/22/2012	253.9	1.106	365,563	404,368.3						
4/23/2012	239.4	1.107	344,794	381,652.7						
4/24/2012	251.4	1.119	361,984	404,976.2						
4/25/2012	121.8	1.008	175,456	176,923.7						
4/26/2012	0.0	1.006	0	0.0						
4/27/2012	67.2	1.005	96,804	97,287.6						
4/28/2012	203.4	1.256	292,899	367,758.8						
4/29/2012	237.5	1.194	342,061	408,477.8						
4/30/2012	81.7	1.033	117,597	121,516.2	5,002,223	5,464,881	1.092	17,901,958	19,267,480	1.076
5/1/2012	0.0	1.010	0	0.0						
5/2/2012	0.0	1.015	0	0.0						
5/3/2012	0.0	1.011	0	0.0						
5/4/2012	58.4	1.010	84,028	84,894.5						
5/5/2012	262.1	1.111	377,410	419,145.5						
5/6/2012	100.7	1.025	145,024	148,646.4						
5/7/2012	0.0	1.009	0	0.0						
5/8/2012	174.5	1.122	251,309	281,977.9						
5/9/2012	196.8	1.132	283,427	320,756.7						
5/10/2012	274.3	1.134	395,033	448,009.3						
5/11/2012	259.1	1.005	373,161	375,185.2						
5/12/2012	260.8	1.129	375,493	423,794.7						
5/13/2012	270.0	1.005	388,795	390,614.9						
5/14/2012	261.4	1.008	376,361	379,242.5						
5/15/2012	174.8	0.982	251,772	247,243.5						
5/16/2012	166.9	1.114	240,352	267,675.8						
5/17/2012	253.4	1.124	364,872	410,118.6						
5/18/2012	256.1	1.127	368,854	415,760.0						
5/19/2012	112.0	1.025	161,245	165,328.2						
5/20/2012	0.0	1.009	0	0.0						
5/21/2012	0.0	1.009	0	0.0						
5/22/2012	0.0	1.012	0	0.0						
5/23/2012	140.2	1.097	201,899	221,389.4						
5/24/2012	256.4	1.014	369,257	374,448.4						
5/25/2012	252.3	1.113	363,286	404,160.0						
5/26/2012	37.7	1.131	54,220	61,306.3						
5/27/2012	85.2	1.030	122,718	126,431.0						
5/28/2012	108.0	1.005	155,586	156,396.7						
5/29/2012	0.0	1.009	0	0.0						
5/30/2012	12.2	1.019	17,595	17,931.7						
5/31/2012	206.3	1.130	297,016	335,521.6	6,018,711	6,475,979	1.076	18,068,012	19,546,085	1.082

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2012	0.0	1.135	0	0.0						
6/2/2012	0.0	1.135	0	0.0						
6/3/2012	0.0	1.137	8	9.4						
6/4/2012	203.5	1.137	293,045	333,262.7						
6/5/2012	220.6	1.145	317,657	363,601.8						
6/6/2012	0.0	1.008	0	0.0						
6/7/2012	49.3	1.025	71,021	72,804.5						
6/8/2012	155.2	1.033	223,499	230,766.4						
6/9/2012	216.5	1.129	311,756	352,054.6						
6/10/2012	249.1	1.129	358,658	404,986.5						
6/11/2012	22.6	1.008	32,481	32,756.8						
6/12/2012	72.8	1.010	104,812	105,901.8						
6/13/2012	256.7	1.128	369,580	416,846.6						
6/14/2012	0.0	1.008	0	0.0						
6/15/2012	27.2	1.015	39,130	39,717.9						
6/16/2012	261.1	1.125	375,977	423,068.8						
6/17/2012	60.6	1.132	87,268	98,796.3						
6/18/2012	126.8	1.132	182,614	206,696.9						
6/19/2012	271.9	1.136	391,596	444,977.2						
6/20/2012	260.2	1.013	374,659	379,393.5						
6/21/2012	222.1	1.121	319,801	358,564.2						
6/22/2012	170.7	1.009	245,776	248,039.8						
6/23/2012	0.0	1.007	0	0.1						
6/24/2012	133.5	1.008	192,216	193,807.4						
6/25/2012	161.9	1.059	233,156	246,968.5						
6/26/2012	38.2	1.046	54,987	57,519.3						
6/27/2012	201.6	1.050	290,274	304,730.3						
6/28/2012	71.1	1.131	102,419	115,794.2						
6/29/2012	225.7	1.143	325,032	371,669.1						
6/30/2012	0.0	1.041	0	0.0	5,297,422	5,802,735	1.095	16,318,355	17,743,595	1.087
7/1/2012	27.8	1.042	40,061	41,749.5						
7/2/2012	159.6	1.009	229,812	231,842.4						
7/3/2012	0.0	1.008	0	0.0						
7/4/2012	0.0	1.009	0	0.0						
7/5/2012	112.4	1.008	161,898	163,157.5						
7/6/2012	196.3	1.003	282,678	283,543.5						
7/7/2012	133.8	1.004	192,639	193,464.2						
7/8/2012	0.0	1.004	0	0.0						
7/9/2012	227.4	1.127	327,445	369,119.6						
7/10/2012	232.5	1.135	334,771	379,863.3						
7/11/2012	219.3	1.006	315,745	317,648.8						
7/12/2012	236.4	1.003	340,426	341,483.7						
7/13/2012	258.5	1.008	372,283	375,247.0						
7/14/2012	250.1	1.003	360,111	361,287.2						
7/15/2012	261.9	1.138	377,106	429,266.8						
7/16/2012	264.3	1.087	380,567	413,638.2						
7/17/2012	242.5	1.141	349,192	398,258.1						
7/18/2012	201.2	1.006	289,750	291,539.1						
7/19/2012	215.3	1.005	310,001	311,493.7						
7/20/2012	209.8	1.051	302,117	317,574.8						
7/21/2012	268.2	1.127	386,276	435,397.7						
7/22/2012	267.5	1.005	385,168	387,157.5						
7/23/2012	279.6	1.004	402,553	404,229.7						
7/24/2012	246.9	1.004	355,553	356,829.5						
7/25/2012	215.5	1.110	310,253	344,292.7						
7/26/2012	0.0	1.114	0	0.0						
7/27/2012	0.0	1.116	0	0.0						
7/28/2012	0.0	1.115	0	0.0						
7/29/2012	0.0	1.115	0	0.0						
7/30/2012	153.3	1.115	220,735	246,029.1						
7/31/2012	237.5	1.131	341,935	386,624.9	7,369,076	7,780,738	1.056	18,685,209	20,059,452	1.074

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2012	263.8	1.133	379,850	430,312.2						
8/2/2012	55.9	1.007	80,531	81,107.6						
8/3/2012	174.0	1.008	250,629	252,542.7						
8/4/2012	156.9	1.113	225,939	251,529.6						
8/5/2012	54.1	1.007	77,959	78,467.7						
8/6/2012	276.6	1.111	398,244	442,601.6						
8/7/2012	258.0	1.120	371,452	416,109.8						
8/8/2012	23.7	1.018	34,189	34,795.7						
8/9/2012	0.0	1.009	0	0.0						
8/10/2012	34.4	1.012	49,534	50,116.1						
8/11/2012	249.6	1.127	359,432	405,248.9						
8/12/2012	162.7	1.139	234,350	267,034.4						
8/13/2012	100.6	1.114	144,839	161,334.8						
8/14/2012	251.9	1.007	362,669	365,256.4						
8/15/2012	88.4	1.140	127,230	145,028.3						
8/16/2012	171.9	1.145	247,551	283,366.9						
8/17/2012	33.2	1.118	47,828	53,471.9						
8/18/2012	10.3	1.117	14,872	16,612.1						
8/19/2012	260.1	1.128	374,538	422,518.6						
8/20/2012	214.8	1.124	309,306	347,727.8						
8/21/2012	80.5	1.006	115,948	116,644.0						
8/22/2012	0.0	1.006	0	0.0						
8/23/2012	0.0	1.006	0	0.0						
8/24/2012	145.3	1.006	209,221	210,507.7						
8/25/2012	216.4	1.212	311,579	377,551.1						
8/26/2012	178.9	1.041	257,603	268,124.1						
8/27/2012	207.1	1.020	298,185	304,050.5						
8/28/2012	190.9	1.213	274,918	333,559.5						
8/29/2012	224.8	1.006	323,648	325,701.6						
8/30/2012	211.1	1.010	303,993	307,120.2						
8/31/2012	0.0	1.119	0	0.0	6,186,033	6,748,442	1.091	18,852,531	20,331,915	1.078
9/1/2012	0.0	1.119	0	0.0						
9/2/2012	0.0	1.118	0	0.0						
9/3/2012	133.6	1.118	192,390	215,103.9						
9/4/2012	49.2	1.007	70,866	71,391.2						
9/5/2012	19.4	1.051	28,008	29,442.4						
9/6/2012	253.8	1.076	365,543	393,196.0						
9/7/2012	235.5	1.010	339,191	342,525.6						
9/8/2012	246.1	1.121	354,428	397,372.8						
9/9/2012	20.8	1.123	30,001	33,678.1						
9/10/2012	0.0	1.123	0	0.0						
9/11/2012	94.3	1.021	135,769	138,663.5						
9/12/2012	211.9	1.129	305,080	344,454.1						
9/13/2012	229.8	1.125	330,966	372,339.1						
9/14/2012	218.5	1.006	314,664	316,570.4						
9/15/2012	222.1	1.003	319,810	320,636.5						
9/16/2012	130.7	1.002	188,195	188,553.2						
9/17/2012	0.0	1.005	0	0.0						
9/18/2012	0.0	1.007	0	0.0						
9/19/2012	135.6	1.007	195,325	196,687.1						
9/20/2012	197.7	1.006	284,718	286,507.8						
9/21/2012	6.2	1.005	8,962	9,004.5						
9/22/2012	98.6	1.011	141,968	143,477.7						
9/23/2012	86.6	1.115	124,734	139,033.2						
9/24/2012	0.0	1.121	0	0.0						
9/25/2012	0.0	1.121	0	0.0						
9/26/2012	0.0	1.113	0	0.0						
9/27/2012	137.5	1.112	198,018	220,156.6						
9/28/2012	225.5	1.132	324,754	367,532.3						
9/29/2012	216.6	1.115	311,959	347,951.9						
9/30/2012	224.5	1.006	323,296	325,355.3	4,888,645	5,199,633	1.064	18,443,754	19,728,813	1.070

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2012	215.3	1.062	310,036	329,129.0						
10/2/2012	182.9	1.117	263,365	294,181.0						
10/3/2012	286.3	1.003	412,270	413,637.9						
10/4/2012	129.7	1.106	186,770	206,579.3						
10/5/2012	228.9	1.129	329,576	372,060.7						
10/6/2012	4.1	1.135	5,962	6,768.6						
10/7/2012	146.7	1.106	211,204	233,615.4						
10/8/2012	0.0	1.007	0	0.0						
10/9/2012	0.0	1.009	0	0.0						
10/10/2012	127.1	1.009	183,050	184,660.4						
10/11/2012	273.1	1.069	393,289	420,449.8						
10/12/2012	155.1	1.133	223,374	253,096.4						
10/13/2012	0.0	1.132	0	0.0						
10/14/2012	18.0	1.132	25,977	29,397.9						
10/15/2012	132.0	1.031	190,074	195,957.1						
10/16/2012	0.0	1.009	0	0.0						
10/17/2012	205.7	1.009	296,273	298,894.7						
10/18/2012	258.5	1.133	372,267	421,880.2						
10/19/2012	11.5	1.036	16,492	17,088.1						
10/20/2012	0.0	1.013	0	0.0						
10/21/2012	0.0	1.014	0	0.0						
10/22/2012	0.0	1.103	20,965	23,133.1						
10/23/2012	240.2	1.116	345,828	385,873.1						
10/24/2012	176.8	1.037	254,630	264,080.5						
10/25/2012	0.0	1.010	0	0.0						
10/26/2012	0.0	1.010	0	0.0						
10/27/2012	0.0	1.010	200,662	202,638.3						
10/28/2012	224.2	1.006	322,804	324,657.2						
10/29/2012	205.6	1.136	296,002	336,319.0						
10/30/2012	243.9	1.135	351,211	398,645.5						
10/31/2012	102.4	1.009	147,511	148,777.3	5,359,594	5,761,520	1.075	16,434,272	17,709,595	1.078
11/1/2012	76.0	1.007	109,383	110,177.5						
11/2/2012	69.8	1.087	100,464	109,184.2						
11/3/2012	36.2	1.071	52,112	55,792.7						
11/4/2012	0.0	1.020	0	0.0						
11/5/2012	0.0	1.020	0	0.0						
11/6/2012	0.0	1.021	0	0.0						
11/7/2012	36.4	1.020	52,355	53,424.7						
11/8/2012	213.6	1.109	307,535	340,948.3						
11/9/2012	223.4	1.081	321,676	347,669.8						
11/10/2012	231.6	1.081	333,565	360,519.6						
11/11/2012	135.5	1.108	195,177	216,278.5						
11/12/2012	232.7	1.124	335,087	376,517.9						
11/13/2012	104.2	1.122	150,050	168,318.3						
11/14/2012	145.1	1.121	208,929	234,211.0						
11/15/2012	60.3	1.122	86,857	97,459.1						
11/16/2012	251.4	1.152	361,986	416,895.8						
11/17/2012	266.1	1.010	383,146	386,797.9						
11/18/2012	53.9	1.005	77,570	77,929.6						
11/19/2012	0.0	1.007	0	0.0						
11/20/2012	100.1	1.010	144,082	145,516.1						
11/21/2012	184.9	1.130	266,267	300,840.9						
11/22/2012	246.5	1.109	354,924	393,612.9						
11/23/2012	248.6	1.119	357,985	400,569.0						
11/24/2012	56.6	1.003	81,526	81,766.5						
11/25/2012	4.5	1.004	6,515	6,540.2						
11/26/2012	0.0	1.004	0	0.0						
11/27/2012	162.3	1.004	233,676	234,721.9						
11/28/2012	230.8	1.121	332,369	372,691.2						
11/29/2012	274.0	1.006	394,488	396,920.7						
11/30/2012	129.1	1.128	185,935	209,794.7	5,433,658	5,895,099	1.085	15,681,897	16,856,253	1.075

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2012	113.2	1.130	163,073	184,221.7						
12/2/2012	221.6	1.105	319,081	352,468.2						
12/3/2012	222.8	1.113	320,903	357,184.2						
12/4/2012	240.0	1.125	345,577	388,703.0						
12/5/2012	28.0	1.105	40,256	44,480.7						
12/6/2012	185.8	1.116	267,517	298,648.6						
12/7/2012	73.2	1.006	105,389	106,018.3						
12/8/2012	0.0	1.021	0	0.0						
12/9/2012	198.9	1.057	286,481	302,827.8						
12/10/2012	228.7	1.140	329,381	375,599.1						
12/11/2012	231.9	1.136	333,936	379,472.8						
12/12/2012	19.0	1.004	27,403	27,501.7						
12/13/2012	0.0	1.004	0	0.0						
12/14/2012	0.0	1.004	0	0.0						
12/15/2012	0.0	1.004	0	0.0						
12/16/2012	260.2	1.005	374,677	376,709.5						
12/17/2012	266.0	1.005	383,010	384,924.8						
12/18/2012	148.7	1.005	214,160	215,214.6						
12/19/2012	0.0	1.004	0	0.0						
12/20/2012	0.0	1.004	0	0.0						
12/21/2012	158.2	1.005	227,801	229,037.8						
12/22/2012	176.3	1.132	253,823	287,408.9						
12/23/2012	111.7	1.127	160,895	181,380.0						
12/24/2012	260.0	1.129	374,337	422,509.9						
12/25/2012	102.4	1.003	147,517	147,906.2						
12/26/2012	0.0	1.008	0	0.0						
12/27/2012	0.1	1.006	107	107.8						
12/28/2012	0.0	1.006	40	40.1						
12/29/2012	0.0	1.006	0	0.0						
12/30/2012	0.0	1.007	0	0.0						
12/31/2012	211.5	1.007	304,570	306,752.1	4,979,935	5,369,118	1.078	15,773,187	17,025,737	1.079
1/1/2013	62.1	1.004	89,449	89,784.0						
1/2/2013	0.0	1.004	0	0.0						
1/3/2013	0.0	1.005	0	0.0						
1/4/2013	0.0	1.004	0	0.0						
1/5/2013	124.0	1.012	178,559	180,712.4						
1/6/2013	265.3	1.165	382,070	445,134.9						
1/7/2013	192.8	1.126	277,624	312,547.9						
1/8/2013	137.3	1.115	197,709	220,508.0						
1/9/2013	233.1	1.129	335,711	379,017.3						
1/10/2013	215.3	1.010	310,096	313,067.4						
1/11/2013	230.5	1.002	331,938	332,654.5						
1/12/2013	218.8	1.121	315,124	353,298.1						
1/13/2013	253.0	1.002	364,322	365,050.5						
1/14/2013	243.0	1.122	349,850	392,589.7						
1/15/2013	121.9	1.005	175,594	176,519.4						
1/16/2013	152.3	1.016	219,304	222,910.1						
1/17/2013	246.6	1.053	355,088	373,778.0						
1/18/2013	170.9	1.120	246,071	275,625.2						
1/19/2013	217.4	1.017	313,053	318,308.8						
1/20/2013	0.0	1.130	0	0.0						
1/21/2013	22.1	1.129	31,850	35,961.2						
1/22/2013	0.0	1.131	0	0.0						
1/23/2013	0.0	1.131	0	0.0						
1/24/2013	0.0	1.131	0	0.0						
1/25/2013	34.9	1.129	50,248	56,746.2						
1/26/2013	139.9	1.109	201,411	223,302.6						
1/27/2013	249.1	1.128	358,661	404,439.6						
1/28/2013	167.7	1.008	241,460	243,482.7						
1/29/2013	163.8	1.008	235,823	237,613.0						
1/30/2013	130.6	1.115	188,120	209,705.2						
1/31/2013	143.2	1.122	206,254	231,385.4	5,955,388	6,394,142	1.074	16,368,981	17,658,359	1.079

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2013	6.9	1.123	9,877	11,091.7						
2/2/2013	198.9	1.010	286,348	289,302.5						
2/3/2013	0.0	1.012	0	0.0						
2/4/2013	0.0	1.011	0	0.0						
2/5/2013	5.9	1.012	8,537	8,638.9						
2/6/2013	229.7	1.090	330,784	360,694.9						
2/7/2013	177.4	1.129	255,448	288,482.4						
2/8/2013	129.8	1.109	186,945	207,381.9						
2/9/2013	100.9	1.098	145,281	159,450.2						
2/10/2013	149.6	1.098	215,485	236,603.6						
2/11/2013	262.0	1.109	377,240	418,399.5						
2/12/2013	254.4	1.014	366,350	371,633.8						
2/13/2013	256.3	1.080	369,109	398,699.1						
2/14/2013	162.2	1.066	233,503	249,013.5						
2/15/2013	247.1	1.121	355,866	398,985.1						
2/16/2013	189.8	1.065	273,308	291,209.6						
2/17/2013	250.0	1.121	360,048	403,773.7						
2/18/2013	69.8	1.114	100,472	111,955.1						
2/19/2013	89.9	1.103	129,508	142,840.0						
2/20/2013	233.9	1.003	336,749	337,636.4						
2/21/2013	204.9	1.121	295,056	330,713.1						
2/22/2013	0.0	1.117	0	0.0						
2/23/2013	181.8	1.118	261,823	292,733.4						
2/24/2013	172.5	1.133	248,378	281,295.5						
2/25/2013	255.0	1.137	367,229	417,367.2						
2/26/2013	85.5	1.002	123,126	123,327.5						
2/27/2013	228.6	1.021	329,196	335,989.1						
2/28/2013	79.1	1.166	113,895	132,844.6	6,079,562	6,600,062	1.086	17,014,885	18,363,322	1.079
3/1/2013	72.5	1.017	104,400	106,186.6						
3/2/2013	105.2	1.108	151,524	167,848.4						
3/3/2013	265.1	1.125	381,672	429,482.4						
3/4/2013	170.4	1.006	245,422	246,950.2						
3/5/2013	156.5	1.102	225,393	248,468.2						
3/6/2013	151.1	1.106	217,567	240,607.1						
3/7/2013	255.3	1.124	367,697	413,369.5						
3/8/2013	356.0	1.123	512,589	575,746.5						
3/9/2013	254.3	1.130	366,262	413,895.9						
3/10/2013	268.8	1.012	387,062	391,768.8						
3/11/2013	276.3	1.131	397,837	450,101.7						
3/12/2013	181.7	1.004	261,590	262,513.1						
3/13/2013	145.5	1.122	209,579	235,114.9						
3/14/2013	173.9	1.132	250,403	283,523.0						
3/15/2013	63.6	1.125	91,535	103,015.2						
3/16/2013	274.1	1.127	394,697	444,907.5						
3/17/2013	0.8	1.112	1,181	1,313.1						
3/18/2013	0.0	1.112	0	0.0						
3/19/2013	0.0	1.113	0	0.0						
3/20/2013	0.0	1.113	0	0.0						
3/21/2013	63.5	1.117	91,464	102,133.6						
3/22/2013	137.2	1.125	197,596	222,390.7						
3/23/2013	263.8	1.128	379,926	428,616.7						
3/24/2013	127.3	1.006	183,255	184,279.9						
3/25/2013	0.0	1.006	0	0.0						
3/26/2013	0.0	1.006	0	0.0						
3/27/2013	0.0	1.007	0	0.0						
3/28/2013	30.0	1.006	43,266	43,542.5						
3/29/2013	258.3	1.006	371,935	374,188.8						
3/30/2013	0.0	1.005	0	0.0						
3/31/2013	0.0	1.005	0	0.0	5,833,854	6,369,964	1.092	17,868,804	19,364,168	1.084

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2013	27.9	1.004	40,240	40,411.2						
4/2/2013	269.7	1.099	388,341	426,645.9						
4/3/2013	254.9	1.005	367,005	368,898.4						
4/4/2013	268.9	1.116	387,273	432,261.4						
4/5/2013	252.1	1.005	363,095	364,794.8						
4/6/2013	42.0	1.003	60,411	60,611.0						
4/7/2013	227.9	1.100	328,149	360,966.6						
4/8/2013	104.4	1.009	150,340	151,702.2						
4/9/2013	0.0	1.006	0	0.0						
4/10/2013	0.0	1.005	0	0.0						
4/11/2013	170.7	1.006	245,753	247,248.5						
4/12/2013	277.2	1.125	399,100	448,990.6						
4/13/2013	275.4	1.101	396,608	436,770.9						
4/14/2013	270.5	1.002	389,453	390,231.8						
4/15/2013	127.8	1.119	183,970	205,853.5						
4/16/2013	0.0	1.019	0	0.0						
4/17/2013	223.2	1.117	321,428	359,020.8						
4/18/2013	210.2	1.127	302,682	340,980.7						
4/19/2013	0.0	1.127	0	0.0						
4/20/2013	0.0	1.127	0	0.0						
4/21/2013	0.0	1.127	0	0.0						
4/22/2013	0.0	1.127	0	0.0						
4/23/2013	0.0	1.126	0	0.0						
4/24/2013	226.9	1.126	326,761	367,848.8						
4/25/2013	56.8	1.004	81,853	82,176.1						
4/26/2013	154.0	1.009	221,772	223,851.6						
4/27/2013	232.9	1.109	335,379	371,990.9						
4/28/2013	117.9	1.113	169,763	188,992.9						
4/29/2013	287.8	1.005	414,397	416,622.7						
4/30/2013	132.7	1.001	191,031	191,281.3	6,064,805	6,478,153	1.068	17,978,221	19,448,179	1.082
5/1/2013	92.5	1.004	133,208	133,720.9						
5/2/2013	268.5	1.094	386,644	423,152.8						
5/3/2013	210.6	1.115	303,228	338,034.9						
5/4/2013	0.0	1.105	0	0.0						
5/5/2013	0.0	1.104	0	0.0						
5/6/2013	0.0	1.105	0	0.0						
5/7/2013	0.0	1.108	0	0.0						
5/8/2013	124.2	1.136	178,793	203,129.3						
5/9/2013	202.8	1.165	291,988	340,042.3						
5/10/2013	178.2	1.166	256,589	299,074.1						
5/11/2013	222.0	1.018	319,632	325,317.6						
5/12/2013	230.4	1.002	331,801	332,429.5						
5/13/2013	245.5	1.102	353,490	389,675.0						
5/14/2013	266.0	1.130	383,056	433,013.5						
5/15/2013	264.6	1.001	381,095	381,534.2						
5/16/2013	54.0	1.121	77,827	87,236.0						
5/17/2013	136.5	1.039	196,614	204,232.1						
5/18/2013	282.3	1.121	406,537	455,558.7						
5/19/2013	287.1	1.060	413,461	438,074.2						
5/20/2013	284.9	1.058	410,212	434,069.7						
5/21/2013	279.8	1.122	402,914	451,965.3						
5/22/2013	274.2	1.004	394,820	396,506.2						
5/23/2013	267.9	1.002	385,707	386,560.0						
5/24/2013	192.4	1.124	277,003	311,293.1						
5/25/2013	271.0	1.005	390,285	392,112.3						
5/26/2013	277.2	1.002	399,149	400,092.1						
5/27/2013	261.2	1.001	376,178	376,474.5						
5/28/2013	199.4	1.002	287,095	287,534.3						
5/29/2013	195.7	1.126	281,761	317,234.7						
5/30/2013	0.0	1.130	0	0.0						
5/31/2013	56.8	1.130	81,755	92,366.3	8,100,843	8,630,434	1.065	19,999,502	21,478,551	1.074

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2013	244.3	1.130	351,759	397,600.0						
6/2/2013	226.9	1.002	326,798	327,555.4						
6/3/2013	189.3	0.999	272,643	272,381.4						
6/4/2013	205.3	1.122	295,628	331,784.4						
6/5/2013	148.8	1.007	214,269	215,846.6						
6/6/2013	0.0	1.005	0	0.0						
6/7/2013	42.3	1.006	60,855	61,191.9						
6/8/2013	119.3	1.095	171,773	188,072.7						
6/9/2013	146.7	1.119	211,196	236,230.5						
6/10/2013	200.2	1.126	288,260	324,674.3						
6/11/2013	138.4	1.096	199,245	218,405.4						
6/12/2013	164.8	1.093	237,256	259,284.8						
6/13/2013	209.9	1.007	302,202	304,271.2						
6/14/2013	189.3	1.006	272,563	274,156.7						
6/15/2013	204.1	1.108	293,863	325,571.3						
6/16/2013	101.9	1.110	146,796	162,882.2						
6/17/2013	13.7	1.114	19,751	21,993.0						
6/18/2013	187.7	1.121	270,250	302,937.9						
6/19/2013	159.0	1.113	228,902	254,732.9						
6/20/2013	165.7	1.123	238,669	268,039.1						
6/21/2013	227.4	1.018	327,387	333,247.4						
6/22/2013	229.6	1.019	330,589	336,749.7						
6/23/2013	206.9	1.088	297,926	324,066.4						
6/24/2013	225.3	1.005	324,431	325,935.1						
6/25/2013	168.5	1.103	242,601	267,551.7						
6/26/2013	157.6	1.104	226,978	250,691.6						
6/27/2013	181.0	1.108	260,582	288,629.7						
6/28/2013	168.6	1.120	242,772	271,842.3						
6/29/2013	146.8	1.008	211,335	212,993.1						
6/30/2013	0.0	1.006	0	0.0	6,867,276	7,359,319	1.072	21,032,924	22,467,905	1.068
7/1/2013	0.0	1.007	0	0.0						
7/2/2013	23.7	1.007	34,196	34,426.7						
7/3/2013	201.1	1.092	289,612	316,240.8						
7/4/2013	227.0	1.127	326,932	368,571.0						
7/5/2013	229.9	1.004	331,060	332,419.7						
7/6/2013	229.9	1.119	331,048	370,600.3						
7/7/2013	185.2	1.008	266,617	268,820.5						
7/8/2013	209.2	1.036	301,272	312,134.1						
7/9/2013	87.5	1.131	126,065	142,544.6						
7/10/2013	161.8	1.131	232,945	263,437.2						
7/11/2013	214.1	1.131	308,339	348,684.4						
7/12/2013	131.7	1.131	189,649	214,473.7						
7/13/2013	227.4	1.098	327,456	359,616.0						
7/14/2013	225.5	1.004	324,756	326,107.0						
7/15/2013	220.8	1.004	317,972	319,176.1						
7/16/2013	229.9	1.120	331,037	370,761.0						
7/17/2013	173.5	1.111	249,769	277,480.6						
7/18/2013	222.8	1.111	320,876	356,544.5						
7/19/2013	229.9	1.023	330,992	338,589.1						
7/20/2013	58.9	1.004	84,887	85,222.9						
7/21/2013	24.1	1.049	34,721	36,435.7						
7/22/2013	229.9	1.095	331,031	362,410.7						
7/23/2013	229.8	1.015	330,936	335,867.1						
7/24/2013	173.4	1.021	249,661	254,839.0						
7/25/2013	214.0	1.116	308,219	343,958.1						
7/26/2013	229.8	1.061	330,983	351,280.2						
7/27/2013	223.1	1.145	321,304	368,048.7						
7/28/2013	229.9	1.002	331,025	331,604.2						
7/29/2013	229.9	1.095	331,035	362,382.3						
7/30/2013	142.9	1.096	205,796	225,651.5						
7/31/2013	0.0	1.096	0	0.0	7,800,189	8,378,328	1.074	22,768,307	24,368,080	1.070

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2013	79.5	1.125	114,495	128,777.7						
8/2/2013	115.2	1.123	165,843	186,209.1						
8/3/2013	156.2	1.121	224,918	252,231.9						
8/4/2013	171.7	1.120	247,299	277,083.1						
8/5/2013	229.9	1.127	331,027	372,923.7						
8/6/2013	227.7	1.010	327,922	331,240.1						
8/7/2013	219.1	1.096	315,517	345,698.7						
8/8/2013	218.5	1.124	314,636	353,507.5						
8/9/2013	198.9	1.005	286,430	287,820.2						
8/10/2013	158.0	1.116	227,578	254,086.9						
8/11/2013	223.4	1.125	321,661	362,006.8						
8/12/2013	87.0	1.128	125,284	141,308.7						
8/13/2013	113.1	1.122	162,874	182,794.2						
8/14/2013	11.8	1.117	16,972	18,952.8						
8/15/2013	221.3	1.023	318,718	326,067.6						
8/16/2013	228.1	1.126	328,472	369,879.7						
8/17/2013	18.7	1.005	26,892	27,030.4						
8/18/2013	44.2	1.005	63,717	64,005.6						
8/19/2013	226.9	1.101	326,730	359,697.1						
8/20/2013	202.4	1.118	291,471	325,944.0						
8/21/2013	183.6	1.129	264,336	298,423.2						
8/22/2013	173.3	1.119	249,546	279,165.7						
8/23/2013	144.3	1.015	207,777	210,896.3						
8/24/2013	242.6	1.006	349,413	351,458.7						
8/25/2013	241.0	1.005	347,086	348,661.0						
8/26/2013	167.0	1.003	240,411	241,210.8						
8/27/2013	232.2	1.103	334,411	368,981.8						
8/28/2013	221.2	1.110	318,529	353,637.4						
8/29/2013	226.2	1.055	325,777	343,630.1						
8/30/2013	223.7	1.007	322,125	324,271.6						
8/31/2013	122.0	1.004	175,646	176,275.2	7,673,512	8,263,878	1.077	22,340,977	24,001,524	1.074
9/1/2013	0.0	1.004	0	0.0						
9/2/2013	211.9	1.005	305,179	306,705.4						
9/3/2013	133.9	1.121	192,785	216,112.0						
9/4/2013	191.4	1.198	275,613	330,184.0						
9/5/2013	178.4	1.183	256,875	303,883.0						
9/6/2013	0.0	1.089	0	0.0						
9/7/2013	0.0	1.088	0	0.0						
9/8/2013	0.0	1.088	0	0.0						
9/9/2013	0.0	1.089	0	0.0						
9/10/2013	162.8	1.119	234,453	262,352.6						
9/11/2013	16.3	1.107	23,497	26,010.9						
9/12/2013	78.4	1.107	112,949	125,034.6						
9/13/2013	219.8	1.107	316,539	350,408.2						
9/14/2013	120.1	1.108	172,989	191,671.4						
9/15/2013	232.9	1.114	335,341	373,569.9						
9/16/2013	239.8	1.005	345,335	347,061.2						
9/17/2013	239.9	1.004	345,407	346,788.4						
9/18/2013	240.2	1.074	345,844	371,436.4						
9/19/2013	230.5	1.121	331,985	372,154.9						
9/20/2013	241.2	1.117	347,354	387,994.6						
9/21/2013	239.9	1.004	345,391	346,772.4						
9/22/2013	236.6	1.110	340,773	378,257.9						
9/23/2013	240.6	1.006	346,422	348,500.9						
9/24/2013	244.8	1.004	352,507	353,916.6						
9/25/2013	243.6	1.072	350,820	376,078.5						
9/26/2013	144.4	1.109	207,904	230,565.5						
9/27/2013	184.7	1.113	265,980	296,036.3						
9/28/2013	239.8	1.013	345,366	349,855.8						
9/29/2013	228.5	1.005	329,079	330,724.5						
9/30/2013	218.6	1.118	314,817	351,965.9	7,141,202	7,674,042	1.075	22,614,903	24,316,247	1.075

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2013	227.4	1.124	327,511	367,968.3						
10/2/2013	234.7	1.005	338,036	339,746.0						
10/3/2013	217.9	1.006	313,812	315,713.7						
10/4/2013	149.9	1.125	215,906	242,920.6						
10/5/2013	239.8	1.025	345,313	353,984.8						
10/6/2013	237.6	1.005	342,211	343,992.0						
10/7/2013	170.4	1.110	245,343	272,315.6						
10/8/2013	81.3	1.125	117,086	131,721.5						
10/9/2013	209.0	1.126	300,967	338,809.5						
10/10/2013	0.0	1.127	0	0.3						
10/11/2013	114.7	1.126	165,199	186,087.7						
10/12/2013	234.9	1.008	338,310	341,164.2						
10/13/2013	219.6	1.131	316,192	357,550.7						
10/14/2013	226.9	1.011	326,702	330,265.5						
10/15/2013	230.9	1.000	332,510	332,616.1						
10/16/2013	227.7	1.118	327,898	366,589.6						
10/17/2013	87.6	1.116	126,176	140,799.1						
10/18/2013	0.0	1.119	0	0.0						
10/19/2013	0.0	1.119	0	0.0						
10/20/2013	11.0	1.118	15,773	17,636.9						
10/21/2013	48.7	1.118	70,115	78,399.0						
10/22/2013	0.0	1.084	0	0.0						
10/23/2013	2.3	1.085	3,329	3,613.2						
10/24/2013	194.6	1.084	280,239	303,738.4						
10/25/2013	228.0	1.084	328,370	355,870.9						
10/26/2013	233.7	1.003	336,590	337,671.5						
10/27/2013	87.1	1.005	125,433	126,093.8						
10/28/2013	0.0	1.005	0	0.0						
10/29/2013	179.7	1.165	258,803	301,526.5						
10/30/2013	24.8	1.165	35,776	41,679.3						
10/31/2013	0.0	1.165	0	0.0	5,933,601	6,328,475	1.067	20,748,316	22,266,394	1.073
11/1/2013	0.0	1.152	0	0.0						
11/2/2013	0.0	1.152	0	0.0						
11/3/2013	0.0	1.152	0	0.0						
11/4/2013	30.4	1.153	43,736	50,421.1						
11/5/2013	101.6	1.108	146,371	162,155.7						
11/6/2013	96.5	1.007	138,956	139,936.2						
11/7/2013	118.9	1.003	171,170	171,629.5						
11/8/2013	156.6	1.004	225,526	226,450.1						
11/9/2013	215.3	1.086	310,060	336,577.3						
11/10/2013	230.4	1.100	331,767	364,803.1						
11/11/2013	236.0	1.003	339,865	341,044.1						
11/12/2013	221.4	1.082	318,757	344,776.4						
11/13/2013	240.3	1.087	345,987	376,051.5						
11/14/2013	245.2	1.003	353,155	354,065.2						
11/15/2013	209.9	1.092	302,198	329,922.5						
11/16/2013	233.2	1.112	335,812	373,550.3						
11/17/2013	219.0	1.107	315,336	348,964.2						
11/18/2013	227.6	1.113	327,794	364,888.6						
11/19/2013	93.4	1.005	134,527	135,236.4						
11/20/2013	28.3	1.005	40,728	40,945.0						
11/21/2013	135.2	1.088	194,697	211,759.0						
11/22/2013	143.5	1.101	206,655	227,451.5						
11/23/2013	246.6	1.126	355,161	400,024.0						
11/24/2013	232.2	1.007	334,372	336,859.5						
11/25/2013	193.6	1.011	278,740	281,749.3						
11/26/2013	226.7	1.123	326,416	366,545.2						
11/27/2013	234.7	1.075	337,954	363,461.7						
11/28/2013	169.9	1.004	244,726	245,591.4						
11/29/2013	0.0	1.004	0	0.0						
11/30/2013	200.8	1.004	289,138	290,189.0	6,749,604	7,185,048	1.065	19,824,407	21,187,564	1.069

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2013	229.7	1.126	330,702	372,252.4						
12/2/2013	27.5	1.119	39,625	44,353.2						
12/3/2013	0.0	1.111	0	0.0						
12/4/2013	216.6	1.112	311,840	346,669.0						
12/5/2013	234.7	1.006	337,917	339,998.5						
12/6/2013	177.2	1.109	255,216	283,115.3						
12/7/2013	0.0	1.088	0	0.0						
12/8/2013	231.9	1.113	333,916	371,598.2						
12/9/2013	132.3	1.157	190,474	220,389.6						
12/10/2013	16.6	1.158	23,867	27,645.1						
12/11/2013	235.6	1.159	339,239	393,072.4						
12/12/2013	145.8	1.068	209,949	224,227.5						
12/13/2013	171.6	1.056	247,171	260,896.1						
12/14/2013	166.8	1.041	240,227	250,193.1						
12/15/2013	53.8	1.042	77,491	80,717.8						
12/16/2013	158.5	1.124	228,293	256,494.1						
12/17/2013	149.8	1.005	215,714	216,691.2						
12/18/2013	221.0	1.123	318,256	357,521.8						
12/19/2013	208.2	1.121	299,811	336,109.9						
12/20/2013	189.3	1.007	272,611	274,607.5						
12/21/2013	50.4	1.006	72,562	73,001.5						
12/22/2013	32.4	1.004	46,598	46,804.5						
12/23/2013	192.0	1.035	276,434	286,196.9						
12/24/2013	0.0	1.120	0	0.0						
12/25/2013	146.4	1.119	210,851	235,909.9						
12/26/2013	121.7	1.112	175,212	194,799.6						
12/27/2013	0.0	1.120	0	0.0						
12/28/2013	0.0	1.120	0	0.0						
12/29/2013	0.0	1.120	0	0.0						
12/30/2013	0.0	1.110	0	0.0						
12/31/2013	120.4	1.109	173,389	192,343.9	5,227,364	5,685,609	1.088	17,910,569	19,199,131	1.072
1/1/2014	204.7	1.004	294,779	295,957.6						
1/2/2014	216.5	1.010	311,724	314,841.4						
1/3/2014	58.4	1.092	84,042	91,774.2						
1/4/2014	0.0	1.095	0	0.0						
1/5/2014	0.0	1.093	0	0.0						
1/6/2014	0.0	1.109	0	0.0						
1/7/2014	0.0	1.095	0	0.0						
1/8/2014	39.1	1.094	56,325	61,619.3						
1/9/2014	230.8	1.094	332,412	363,659.0						
1/10/2014	216.1	1.101	311,169	342,597.4						
1/11/2014	189.5	1.108	272,948	302,426.4						
1/12/2014	225.4	1.118	324,520	362,813.2						
1/13/2014	223.4	1.117	321,747	359,392.0						
1/14/2014	144.6	1.073	208,229	223,430.2						
1/15/2014	197.3	1.090	284,125	309,695.9						
1/16/2014	180.8	1.107	260,409	288,272.4						
1/17/2014	240.6	1.110	346,449	384,557.9						
1/18/2014	141.8	1.065	204,171	217,442.1						
1/19/2014	148.8	1.121	214,311	240,242.1						
1/20/2014	74.2	1.133	106,831	121,039.9						
1/21/2014	152.4	1.008	219,456	221,211.9						
1/22/2014	128.9	1.004	185,575	186,317.5						
1/23/2014	236.5	1.104	340,598	376,020.1						
1/24/2014	26.7	1.060	38,379	40,681.5						
1/25/2014	73.4	1.056	105,666	111,582.8						
1/26/2014	218.0	1.007	313,879	316,075.9						
1/27/2014	228.0	1.048	328,384	344,146.2						
1/28/2014	231.5	1.088	333,390	362,728.7						
1/29/2014	209.3	1.087	301,422	327,646.2						
1/30/2014	223.2	1.005	321,472	323,079.3						
1/31/2014	49.1	1.007	70,769	71,264.4	6,493,181	6,960,515	1.072	18,470,149	19,831,172	1.074

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2014	87.4	1.007	125,820	126,700.3						
2/2/2014	141.3	1.154	203,447	234,777.4						
2/3/2014	159.7	1.171	229,925	269,242.2						
2/4/2014	237.4	1.138	341,855	389,030.8						
2/5/2014	208.7	1.108	300,524	332,980.8						
2/6/2014	234.9	1.005	338,249	339,939.9						
2/7/2014	209.9	1.107	302,232	334,570.5						
2/8/2014	0.0	1.102	0	0.0						
2/9/2014	0.0	1.101	0	0.0						
2/10/2014	0.0	1.099	0	0.0						
2/11/2014	230.2	1.101	331,474	364,952.9						
2/12/2014	169.9	1.125	244,679	275,264.0						
2/13/2014	232.3	1.126	334,467	376,609.5						
2/14/2014	238.5	1.007	343,401	345,804.4						
2/15/2014	47.5	1.121	68,371	76,643.9						
2/16/2014	223.4	1.072	321,655	344,814.6						
2/17/2014	240.1	1.018	345,686	351,908.2						
2/18/2014	83.2	1.070	119,839	128,227.9						
2/19/2014	189.7	1.070	273,148	292,268.2						
2/20/2014	235.0	1.068	338,360	361,368.5						
2/21/2014	234.4	1.006	337,500	339,525.3						
2/22/2014	231.5	1.088	333,317	362,648.6						
2/23/2014	230.0	1.015	331,157	336,124.0						
2/24/2014	225.6	1.106	324,881	359,318.3						
2/25/2014	115.7	1.105	166,634	184,130.3						
2/26/2014	9.5	1.125	13,673	15,382.0						
2/27/2014	93.1	1.124	134,080	150,705.7						
2/28/2014	216.8	1.010	312,203	315,325.4	6,516,575	7,008,263	1.075	18,237,120	19,654,388	1.078
3/1/2014	164.3	1.080	236,569	255,494.1						
3/2/2014	42.5	1.084	61,250	66,394.8						
3/3/2014	23.8	1.085	34,265	37,178.0						
3/4/2014	107.1	1.085	154,189	167,295.1						
3/5/2014	161.3	1.080	232,289	250,872.6						
3/6/2014	236.6	1.004	340,748	342,110.8						
3/7/2014	185.0	1.004	266,468	267,533.8						
3/8/2014	0.0	1.002	0	0.0						
3/9/2014	238.8	1.003	343,847	344,878.3						
3/10/2014	64.2	1.012	92,438	93,547.4						
3/11/2014	0.0	1.006	0	0.0						
3/12/2014	0.0	1.006	0	0.0						
3/13/2014	0.0	1.006	0	0.0						
3/14/2014	0.0	1.007	0	0.0						
3/15/2014	92.8	1.006	133,662	134,464.2						
3/16/2014	226.9	1.079	326,697	352,506.2						
3/17/2014	229.1	1.103	329,966	363,952.1						
3/18/2014	224.6	1.112	323,475	359,704.3						
3/19/2014	240.0	1.050	345,651	362,934.1						
3/20/2014	143.2	1.140	206,268	235,145.9						
3/21/2014	227.1	1.155	327,028	377,717.7						
3/22/2014	119.1	1.163	171,486	199,437.7						
3/23/2014	0.0	1.114	0	0.0						
3/24/2014	0.0	1.163	0	0.0						
3/25/2014	0.0	1.164	0	0.0						
3/26/2014	0.0	1.161	0	0.0						
3/27/2014	174.4	1.162	251,122	291,803.8						
3/28/2014	213.1	1.163	306,848	356,863.7						
3/29/2014	176.5	1.005	254,091	255,361.1						
3/30/2014	203.8	1.047	293,532	307,328.1						
3/31/2014	81.8	1.136	117,852	133,880.1	5,149,741	5,556,404	1.079	18,159,496	19,525,182	1.075

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2014	237.4	1.133	341,882	387,352.8						
4/2/2014	0.0	1.130	0	0.0						
4/3/2014	0.0	1.102	0	0.0						
4/4/2014	10.3	1.102	14,817	16,327.9						
4/5/2014	23.7	1.112	34,113	37,933.5						
4/6/2014	0.0	1.111	0	0.0						
4/7/2014	0.0	1.113	0	0.0						
4/8/2014	0.0	1.113	0	0.0						
4/9/2014	0.0	1.113	0	0.0						
4/10/2014	53.3	1.112	76,687	85,276.0						
4/11/2014	230.7	1.017	332,232	337,879.7						
4/12/2014	234.7	1.006	337,962	339,989.7						
4/13/2014	156.6	1.075	225,458	242,366.9						
4/14/2014	216.6	1.107	311,885	345,256.4						
4/15/2014	42.3	1.117	60,888	68,011.8						
4/16/2014	172.6	1.116	248,539	277,369.5						
4/17/2014	82.8	1.006	119,254	119,969.7						
4/18/2014	216.1	1.016	311,153	316,131.6						
4/19/2014	102.6	1.132	147,676	167,169.2						
4/20/2014	205.5	1.113	295,923	329,361.8						
4/21/2014	0.0	1.098	0	0.0						
4/22/2014	198.9	1.010	286,474	289,338.4						
4/23/2014	0.0	1.005	0	0.0						
4/24/2014	0.0	1.007	0	0.0						
4/25/2014	0.0	1.007	0	0.0						
4/26/2014	148.5	1.006	213,825	215,108.4						
4/27/2014	221.1	1.152	318,440	366,842.5						
4/28/2014	228.4	1.078	328,837	354,486.2						
4/29/2014	84.2	1.005	121,235	121,841.1						
4/30/2014	123.3	1.096	177,550	194,594.5	4,304,828	4,612,608	1.071	15,971,144	17,177,275	1.076
5/1/2014	103.2	1.127	148,570	167,438.1						
5/2/2014	0.0	1.127	0	0.0						
5/3/2014	166.7	1.127	239,985	270,463.4						
5/4/2014	196.9	1.096	283,551	310,771.6						
5/5/2014	113.3	1.004	163,201	163,854.1						
5/6/2014	95.7	1.062	137,754	146,294.9						
5/7/2014	148.0	1.095	213,147	233,395.6						
5/8/2014	232.8	1.115	335,232	373,783.9						
5/9/2014	19.9	1.093	28,727	31,398.6						
5/10/2014	200.2	1.097	288,348	316,318.0						
5/11/2014	24.3	1.111	34,964	38,845.3						
5/12/2014	0.0	1.110	0	0.0						
5/13/2014	135.4	1.111	195,003	216,648.5						
5/14/2014	109.8	1.004	158,122	158,754.4						
5/15/2014	116.9	1.003	168,298	168,802.7						
5/16/2014	0.0	1.003	0	0.0						
5/17/2014	0.0	1.002	0	0.0						
5/18/2014	0.0	1.003	0	0.0						
5/19/2014	87.5	1.004	126,056	126,560.4						
5/20/2014	209.3	1.034	301,332	311,577.6						
5/21/2014	210.2	1.117	302,673	338,085.6						
5/22/2014	217.0	1.008	312,419	314,917.9						
5/23/2014	226.7	1.098	326,385	358,370.4						
5/24/2014	196.0	1.111	282,283	313,616.7						
5/25/2014	240.0	1.005	345,586	347,313.8						
5/26/2014	238.0	1.097	342,757	376,003.9						
5/27/2014	240.0	1.004	345,599	346,981.5						
5/28/2014	216.8	1.006	312,195	314,068.1						
5/29/2014	201.1	1.017	289,535	294,456.7						
5/30/2014	232.2	1.003	334,356	335,358.6						
5/31/2014	236.7	1.002	340,850	341,531.7	6,356,927	6,715,612	1.056	15,811,496	16,884,623	1.068

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2014	176.8	1.001	254,585	254,840.1						
6/2/2014	95.2	1.001	137,115	137,251.7						
6/3/2014	224.2	1.002	322,793	323,439.0						
6/4/2014	237.3	1.011	341,727	345,486.5						
6/5/2014	226.6	1.129	326,346	368,444.2						
6/6/2014	222.3	1.142	320,171	365,635.1						
6/7/2014	208.5	1.019	300,168	305,871.6						
6/8/2014	93.0	1.003	133,918	134,319.3						
6/9/2014	0.0	1.075	1	1.1						
6/10/2014	0.0	1.075	0	0.0						
6/11/2014	0.0	1.075	0	0.0						
6/12/2014	93.1	1.075	134,122	144,181.5						
6/13/2014	219.2	1.105	315,618	348,758.2						
6/14/2014	213.9	1.118	308,037	344,384.8						
6/15/2014	240.9	1.008	346,837	349,611.3						
6/16/2014	223.5	1.003	321,850	322,815.1						
6/17/2014	219.0	1.140	315,320	359,464.4						
6/18/2014	237.4	1.107	341,852	378,430.0						
6/19/2014	146.5	1.008	210,959	212,646.6						
6/20/2014	15.2	1.007	21,880	22,033.0						
6/21/2014	228.7	1.090	329,360	359,002.3						
6/22/2014	151.9	1.115	218,779	243,938.3						
6/23/2014	209.9	1.120	302,288	338,562.8						
6/24/2014	232.5	1.123	334,784	375,962.2						
6/25/2014	240.0	1.004	345,606	346,988.5						
6/26/2014	136.5	1.002	196,497	196,890.3						
6/27/2014	226.8	1.085	326,582	354,341.6						
6/28/2014	240.0	1.010	345,543	348,998.3						
6/29/2014	240.0	1.002	345,628	346,319.3						
6/30/2014	231.2	1.002	332,869	333,534.5	7,531,234	7,962,151	1.057	18,192,989	19,290,371	1.060
7/1/2014	75.4	1.096	108,571	118,993.4						
7/2/2014	36.3	0.000	52,283	0.0						
7/3/2014	151.5	1.132	218,104	246,893.4						
7/4/2014	220.6	1.136	317,655	360,855.7						
7/5/2014	55.3	1.117	79,681	89,003.9						
7/6/2014	184.1	1.117	265,085	296,099.4						
7/7/2014	240.0	1.002	345,616	346,307.3						
7/8/2014	208.3	1.001	299,889	300,188.6						
7/9/2014	0.0	1.095	0	0.0						
7/10/2014	0.0	1.095	0	0.0						
7/11/2014	0.0	1.095	0	0.0						
7/12/2014	0.0	1.097	0	0.0						
7/13/2014	135.4	1.095	195,003	213,528.5						
7/14/2014	109.8	1.165	158,122	184,212.0						
7/15/2014	116.9	1.167	168,298	196,403.6						
7/16/2014	0.0	1.167	0	0.0						
7/17/2014	0.0	1.164	0	0.0						
7/18/2014	0.0	1.167	0	0.0						
7/19/2014	87.5	1.166	126,056	146,981.5						
7/20/2014	209.3	1.066	301,332	321,220.2						
7/21/2014	210.2	1.165	302,673	352,613.9						
7/22/2014	217.0	1.024	312,419	319,916.6						
7/23/2014	226.7	1.005	326,385	328,016.6						
7/24/2014	196.0	1.007	282,283	284,259.3						
7/25/2014	240.0	1.140	345,586	393,967.9						
7/26/2014	238.0	1.140	342,757	390,742.4						
7/27/2014	240.0	1.138	345,599	393,291.8						
7/28/2014	216.8	1.138	312,195	355,277.9						
7/29/2014	201.1	1.138	289,535	329,490.4						
7/30/2014	232.2	1.071	334,356	358,094.8						
7/31/2014	236.7	1.002	340,850	341,531.7	6,170,330	6,667,891	1.081	20,058,490	21,345,655	1.064

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2014	0.0	1.003	0	0.0						
8/2/2014	0.0	1.004	0	0.0						
8/3/2014	136.6	1.005	196,691	197,674.9						
8/4/2014	250.0	1.002	359,949	360,668.8						
8/5/2014	222.2	1.002	320,006	320,646.4						
8/6/2014	26.7	1.115	38,505	42,932.8						
8/7/2014	0.0	1.114	0	0.0						
8/8/2014	199.0	1.105	286,619	316,713.9						
8/9/2014	17.8	1.122	25,580	28,700.5						
8/10/2014	7.5	1.123	10,768	12,092.6						
8/11/2014	217.0	1.122	312,501	350,625.6						
8/12/2014	240.0	1.111	345,556	383,913.1						
8/13/2014	240.0	1.002	345,609	346,299.8						
8/14/2014	19.0	1.002	27,358	27,412.8						
8/15/2014	0.0	1.003	0	0.0						
8/16/2014	0.0	1.003	0	0.0						
8/17/2014	87.1	1.004	125,360	125,861.1						
8/18/2014	218.6	1.115	314,779	350,978.9						
8/19/2014	24.1	1.160	34,700	40,251.7						
8/20/2014	0.0	1.164	0	0.0						
8/21/2014	168.2	1.164	242,142	281,853.2						
8/22/2014	201.2	1.133	289,769	328,308.7						
8/23/2014	240.0	1.006	345,602	347,675.8						
8/24/2014	226.6	1.050	326,335	342,651.4						
8/25/2014	186.4	1.116	268,470	299,612.2						
8/26/2014	0.0	1.112	0	0.0						
8/27/2014	193.3	1.114	278,381	310,116.2						
8/28/2014	118.1	1.136	170,100	193,233.3						
8/29/2014	232.4	1.032	334,715	345,425.4						
8/30/2014	188.3	1.004	271,127	272,211.9						
8/31/2014	97.8	1.003	140,781	141,203.1	5,411,402	5,767,064	1.066	19,112,965	20,397,106	1.067
9/1/2014	222.1	1.001	319,868	320,188.0						
9/2/2014	124.0	1.001	178,514	178,692.9						
9/3/2014	0.0	1.002	0	0.0						
9/4/2014	11.4	1.003	16,450	16,499.8						
9/5/2014	233.5	1.003	336,240	337,248.6						
9/6/2014	113.0	1.002	162,670	162,995.8						
9/7/2014	185.8	1.003	267,599	268,401.9						
9/8/2014	219.0	1.068	315,349	336,792.9						
9/9/2014	225.0	1.127	323,931	365,070.6						
9/10/2014	7.6	1.126	10,969	12,351.3						
9/11/2014	0.0	1.127	0	0.0						
9/12/2014	161.8	1.125	232,960	262,080.4						
9/13/2014	220.9	1.001	318,050	318,368.1						
9/14/2014	220.1	1.001	316,945	317,261.7						
9/15/2014	224.3	1.131	322,961	365,268.4						
9/16/2014	222.3	1.141	320,157	365,299.1						
9/17/2014	224.4	1.005	323,171	324,786.9						
9/18/2014	229.0	1.006	329,805	331,783.4						
9/19/2014	211.4	1.000	304,456	304,456.1						
9/20/2014	216.6	1.000	311,900	311,900.4						
9/21/2014	249.9	1.000	359,900	359,900.2						
9/22/2014	250.0	1.002	359,936	360,655.9						
9/23/2014	232.9	1.001	335,372	335,707.3						
9/24/2014	211.0	1.091	303,903	331,558.2						
9/25/2014	221.2	1.015	318,575	323,353.9						
9/26/2014	230.0	1.000	331,179	331,178.7						
9/27/2014	218.0	1.003	313,942	314,884.0						
9/28/2014	229.9	1.004	330,985	332,309.1						
9/29/2014	178.4	1.101	256,951	282,903.5						
9/30/2014	154.3	1.108	222,249	246,251.7	7,844,989	8,118,149	1.035	19,426,721	20,553,104	1.058

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2014	179.7	1.123	258,750	290,576.8						
10/2/2014	61.6	1.122	88,751	99,578.9						
10/3/2014	247.3	1.125	356,063	400,570.7						
10/4/2014	235.5	1.012	339,184	343,254.0						
10/5/2014	230.0	1.002	331,225	331,887.8						
10/6/2014	0.2	1.002	231	231.3						
10/7/2014	0.0	1.003	0	0.0						
10/8/2014	0.0	1.004	0	0.0						
10/9/2014	0.0	1.004	0	0.0						
10/10/2014	0.0	1.004	0	0.0						
10/11/2014	0.0	1.004	0	0.0						
10/12/2014	129.0	1.004	185,715	186,458.1						
10/13/2014	202.1	1.104	291,027	321,294.0						
10/14/2014	189.4	1.004	272,690	273,780.4						
10/15/2014	217.0	1.002	312,515	313,140.2						
10/16/2014	188.2	1.078	271,046	292,187.4						
10/17/2014	42.6	1.106	61,400	67,908.7						
10/18/2014	235.5	1.024	339,067	347,204.8						
10/19/2014	203.7	1.001	293,377	293,670.5						
10/20/2014	131.8	1.150	189,837	218,312.7						
10/21/2014	0.0	1.158	0	0.0						
10/22/2014	0.0	1.150	0	0.0						
10/23/2014	0.0	1.155	0	0.0						
10/24/2014	0.0	1.158	0	0.0						
10/25/2014	0.0	1.157	0	0.0						
10/26/2014	0.0	1.156	0	0.0						
10/27/2014	0.0	0.000	0	0.0						
10/28/2014	0.0	0.000	0	0.0						
10/29/2014	0.0	1.152	0	0.0						
10/30/2014	19.1	1.156	27,489	31,777.7						
10/31/2014	121.4	1.156	174,841	202,116.0	3,793,209	4,013,950	1.058	17,049,601	17,899,163	1.050
11/1/2014	202.3	1.171	291,353	341,173.9						
11/2/2014	158.4	1.001	228,097	228,324.6						
11/3/2014	0.0	1.019	0	0.0						
11/4/2014	0.0	1.019	0	0.0						
11/5/2014	0.0	1.020	0	0.0						
11/6/2014	0.0	1.020	0	0.0						
11/7/2014	0.0	1.020	0	0.0						
11/8/2014	0.0	1.021	0	0.0						
11/9/2014	151.2	1.021	217,771	222,343.7						
11/10/2014	217.5	1.004	313,250	314,503.4						
11/11/2014	202.7	1.098	291,885	320,489.2						
11/12/2014	152.3	1.162	219,267	254,788.2						
11/13/2014	60.2	1.156	86,748	100,281.1						
11/14/2014	0.0	1.158	0	0.0						
11/15/2014	117.8	1.157	169,638	196,271.5						
11/16/2014	212.4	1.155	305,878	353,288.5						
11/17/2014	235.2	1.010	338,709	342,096.2						
11/18/2014	191.8	1.107	276,143	305,690.2						
11/19/2014	129.8	1.120	186,867	209,291.3						
11/20/2014	229.4	1.005	330,346	331,997.6						
11/21/2014	177.8	1.151	256,013	294,670.4						
11/22/2014	151.8	1.081	218,597	236,303.8						
11/23/2014	226.7	1.145	326,464	373,801.5						
11/24/2014	234.1	1.009	337,140	340,174.1						
11/25/2014	121.7	1.005	175,278	176,154.4						
11/26/2014	223.1	1.053	321,240	338,265.9						
11/27/2014	212.8	1.131	306,366	346,500.5						
11/28/2014	218.6	1.129	314,796	355,404.5						
11/29/2014	214.2	1.007	308,395	310,554.2						
11/30/2014	77.5	1.128	111,605	125,890.6	5,931,846	6,418,259	1.082	17,570,045	18,550,358	1.056

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2014	0.0	1.130	0	0.0						
12/2/2014	0.0	1.130	0	0.0						
12/3/2014	66.7	1.131	95,980	108,553.2						
12/4/2014	0.0	1.018	0	0.0						
12/5/2014	54.1	1.016	77,915	79,161.4						
12/6/2014	222.7	1.005	320,651	322,254.4						
12/7/2014	212.4	1.008	305,817	308,263.4						
12/8/2014	56.3	1.004	81,025	81,349.0						
12/9/2014	134.5	1.103	193,660	213,607.2						
12/10/2014	230.1	1.104	331,380	365,843.7						
12/11/2014	99.8	1.136	143,731	163,277.8						
12/12/2014	0.0	1.134	0	0.0						
12/13/2014	34.6	1.133	49,892	56,528.2						
12/14/2014	122.2	1.157	176,029	203,665.1						
12/15/2014	177.4	1.183	255,393	302,130.3						
12/16/2014	43.3	1.185	62,358	73,893.6						
12/17/2014	225.5	1.140	324,688	370,144.6						
12/18/2014	224.4	1.130	323,067	365,066.1						
12/19/2014	220.0	1.029	316,858	326,047.0						
12/20/2014	225.4	1.003	324,578	325,551.8						
12/21/2014	229.0	1.004	329,828	331,147.4						
12/22/2014	226.5	1.130	326,145	368,543.8						
12/23/2014	108.9	0.000	156,791	0.0						
12/24/2014	0.0	1.134	0	0.0						
12/25/2014	96.4	1.132	138,874	157,205.1						
12/26/2014	228.1	1.006	328,460	330,430.3						
12/27/2014	229.1	1.003	329,839	330,828.9						
12/28/2014	80.5	1.003	115,946	116,294.0						
12/29/2014	145.8	1.098	209,996	230,575.7						
12/30/2014	203.5	1.112	292,981	325,795.1						
12/31/2014	92.2	1.128	132,786	149,783.0	5,744,668	6,005,940	1.045	15,469,723	16,438,149	1.063
1/1/2015	174.3	1.127	250,973	282,896.6						
1/2/2015	0.0	1.004	0	0.0						
1/3/2015	141.3	1.004	203,486	204,277.0						
1/4/2015	218.4	1.099	314,519	345,504.3						
1/5/2015	227.7	1.045	327,848	342,544.6						
1/6/2015	59.6	1.002	85,817	85,978.6						
1/7/2015	163.0	1.003	234,681	235,370.7						
1/8/2015	117.0	1.112	168,472	187,382.3						
1/9/2015	153.2	1.134	220,601	250,064.5						
1/10/2015	0.0	1.126	0	0.0						
1/11/2015	32.8	1.126	47,268	53,200.1						
1/12/2015	231.7	1.034	333,685	345,061.5						
1/13/2015	73.0	1.009	105,092	106,058.3						
1/14/2015	0.0	1.004	0	0.0						
1/15/2015	215.1	1.005	309,749	311,227.9						
1/16/2015	176.8	1.003	254,605	255,393.6						
1/17/2015	235.5	1.077	339,053	365,051.8						
1/18/2015	140.9	1.003	202,937	203,616.5						
1/19/2015	0.0	1.003	0	0.0						
1/20/2015	0.0	1.010	0	0.0						
1/21/2015	0.0	1.004	0	0.0						
1/22/2015	153.7	0.476	221,292	105,334.9						
1/23/2015	381.8	1.000	549,793	549,985.2						
1/24/2015	227.5	1.000	327,533	327,682.5						
1/25/2015	225.6	1.121	324,842	364,095.7						
1/26/2015	230.0	1.128	331,216	373,664.3						
1/27/2015	108.2	1.004	155,818	156,375.6						
1/28/2015	144.3	1.004	207,762	208,495.1						
1/29/2015	216.3	1.126	311,418	350,575.8						
1/30/2015	221.7	1.139	319,285	363,515.6						
1/31/2015	58.5	1.005	84,179	84,617.4	6,231,922	6,457,970	1.036	17,908,436	18,882,170	1.054

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2015	215.8	1.053	310,749	327,303.4						
2/2/2015	23.6	1.062	33,927	36,035.9						
2/3/2015	207.4	1.071	298,651	319,723.9						
2/4/2015	228.8	1.106	329,542	364,486.1						
2/5/2015	50.6	1.088	72,820	79,224.5						
2/6/2015	0.0	1.072	0	0.0						
2/7/2015	50.2	1.060	72,217	76,531.4						
2/8/2015	178.3	1.091	256,793	280,068.1						
2/9/2015	0.0	1.093	0	0.0						
2/10/2015	0.0	1.093	0	0.0						
2/11/2015	133.0	1.117	191,464	213,927.9						
2/12/2015	227.0	1.136	326,891	371,432.8						
2/13/2015	223.6	1.090	322,051	350,964.5						
2/14/2015	213.2	1.006	306,972	308,943.6						
2/15/2015	78.2	1.147	112,565	129,153.1						
2/16/2015	220.1	1.162	316,988	368,258.1						
2/17/2015	212.7	1.151	306,298	352,623.8						
2/18/2015	213.0	1.005	306,671	308,083.9						
2/19/2015	172.0	1.093	247,678	270,745.1						
2/20/2015	0.0	1.141	0	0.0						
2/21/2015	0.0	1.083	0	0.0						
2/22/2015	77.1	1.100	111,056	122,149.6						
2/23/2015	163.5	1.105	235,441	260,260.6						
2/24/2015	0.0	1.005	0	0.0						
2/25/2015	0.0	1.005	0	0.0						
2/26/2015	0.0	1.094	0	0.0						
2/27/2015	0.0	1.006	0	0.0						
2/28/2015	0.0	1.008	0	0.0	4,158,774	4,539,916	1.092	16,135,363	17,003,827	1.054
3/1/2015	34.0	1.006	48,912	49,217.9						
3/2/2015	236.7	1.006	340,869	342,930.3						
3/3/2015	108.0	1.003	155,469	155,895.7						
3/4/2015	217.9	1.011	313,759	317,229.3						
3/5/2015	230.5	1.134	331,965	376,465.5						
3/6/2015	144.8	1.019	208,523	212,483.2						
3/7/2015	0.0	1.096	0	0.0						
3/8/2015	0.0	1.007	0	0.0						
3/9/2015	183.1	1.008	263,727	265,780.8						
3/10/2015	226.4	1.004	326,080	327,418.6						
3/11/2015	222.1	1.002	319,846	320,635.7						
3/12/2015	219.8	1.118	316,555	353,840.9						
3/13/2015	225.0	1.120	324,036	363,057.9						
3/14/2015	211.8	1.008	305,000	307,425.5						
3/15/2015	109.8	1.004	158,079	158,679.0						
3/16/2015	0.0	1.105	0	0.0						
3/17/2015	0.0	1.003	0	0.0						
3/18/2015	131.4	1.005	189,249	190,156.1						
3/19/2015	210.2	1.083	302,751	327,847.4						
3/20/2015	229.6	1.006	330,619	332,602.5						
3/21/2015	214.6	1.176	308,996	363,444.4						
3/22/2015	225.5	1.000	324,649	324,648.8						
3/23/2015	378.2	1.002	544,634	545,892.7						
3/24/2015	140.1	1.002	201,736	202,192.0						
3/25/2015	0.0	1.003	0	0.0						
3/26/2015	0.0	1.004	0	0.0						
3/27/2015	184.3	1.003	265,400	266,168.1						
3/28/2015	211.8	1.004	305,053	306,404.5						
3/29/2015	167.5	1.010	241,162	243,549.7						
3/30/2015	213.9	1.005	308,054	309,482.2						
3/31/2015	71.6	1.037	103,085	106,943.3	6,838,207	7,070,392	1.034	17,228,902	18,068,279	1.049

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Volume Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2015	105.3	1.007	151,690	152,728.7						
4/2/2015	70.7	1.004	101,845	102,215.4						
4/3/2015	40.7	1.003	58,565	58,727.9						
4/4/2015	0.0	1.031	0	0.0						
4/5/2015	20.6	1.033	29,623	30,597.3						
4/6/2015	65.4	1.033	94,244	97,364.3						
4/7/2015	172.3	1.034	248,115	256,447.6						
4/8/2015	77.2	1.004	111,198	111,620.0						
4/9/2015	2.7	1.022	3,924	4,008.6						
4/10/2015	89.5	1.022	128,904	131,795.3						
4/11/2015	184.0	1.022	265,021	270,964.2						
4/12/2015	213.1	1.118	306,898	343,260.1						
4/13/2015	214.5	1.064	308,926	328,832.4						
4/14/2015	100.5	1.006	144,678	145,607.6						
4/15/2015	26.2	1.006	37,711	37,932.8						
4/16/2015	222.5	1.131	320,359	362,241.1						
4/17/2015	223.0	1.121	321,121	359,962.4						
4/18/2015	239.1	1.003	344,260	345,277.3						
4/19/2015	240.6	1.002	346,515	347,171.5						
4/20/2015	221.5	1.001	318,935	319,403.6						
4/21/2015	16.1	1.060	23,198	24,591.9						
4/22/2015	230.9	1.030	332,507	342,482.6						
4/23/2015	265.6	1.012	382,500	387,049.5						
4/24/2015	177.2	1.009	255,115	257,426.5						
4/25/2015	235.5	1.105	339,097	374,825.7						
4/26/2015	223.8	1.106	322,262	356,539.1						
4/27/2015	234.7	1.004	337,921	339,416.3						
4/28/2015	193.0	1.005	277,873	279,394.7						
4/29/2015	182.9	1.006	263,325	264,779.5						
4/30/2015	42.5	1.120	61,135	68,442.4	6,237,465	6,501,106	1.042	17,234,445	18,111,415	1.051
5/1/2015	198.9	1.116	286,363	319,655.1						
5/2/2015	0.0	1.109	0	0.0						
5/3/2015	124.2	1.111	178,898	198,813.0						
5/4/2015	14.1	1.010	20,364	20,574.1						
5/5/2015	209.9	1.126	302,216	340,249.2						
5/6/2015	216.7	1.129	312,055	352,245.6						
5/7/2015	207.7	1.005	299,055	300,598.0						
5/8/2015	216.2	1.004	311,325	312,555.9						
5/9/2015	163.1	1.114	234,884	261,575.3						
5/10/2015	194.1	1.121	279,506	313,427.8						
5/11/2015	219.8	1.122	316,538	355,274.8						
5/12/2015	103.8	1.121	149,457	167,564.7						
5/13/2015	170.2	1.120	245,024	274,375.0						
5/14/2015	232.7	1.005	335,057	336,752.7						
5/15/2015	218.4	1.004	314,447	315,608.9						
5/16/2015	221.5	1.004	318,973	320,136.9						
5/17/2015	214.3	1.004	308,641	309,940.7						
5/18/2015	224.8	1.137	323,693	368,009.3						
5/19/2015	217.6	1.135	313,318	355,632.5						
5/20/2015	34.8	1.012	50,180	50,785.3						
5/21/2015	173.5	1.006	249,776	251,317.6						
5/22/2015	133.3	1.103	192,017	211,826.4						
5/23/2015	272.6	1.104	392,548	433,480.0						
5/24/2015	218.0	1.092	313,942	342,957.5						
5/25/2015	189.5	1.005	272,855	274,206.8						
5/26/2015	160.4	1.005	230,991	232,223.0						
5/27/2015	239.8	1.003	345,378	346,414.3						
5/28/2015	236.4	1.003	340,463	341,448.5						
5/29/2015	219.7	1.002	316,302	316,850.3						
5/30/2015	229.5	1.001	330,433	330,763.2						
5/31/2015	223.0	1.001	321,079	321,550.6	8,205,776	8,676,813	1.057	21,281,448	22,248,311	1.045

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2015	215.0	1.000	309,618	309,552.3						
6/2/2015	207.8	1.002	299,211	299,671.0						
6/3/2015	216.8	1.119	312,203	349,355.3						
6/4/2015	194.7	1.021	280,437	286,207.3						
6/5/2015	157.0	1.133	226,111	256,256.2						
6/6/2015	158.1	1.157	227,620	263,355.9						
6/7/2015	229.2	1.160	330,116	382,935.1						
6/8/2015	232.4	1.138	334,710	380,745.3						
6/9/2015	235.5	1.005	339,169	340,974.9						
6/10/2015	147.7	1.102	212,758	234,553.0						
6/11/2015	161.4	1.119	232,381	260,099.0						
6/12/2015	220.0	1.107	316,784	350,718.4						
6/13/2015	240.8	1.016	346,771	352,214.3						
6/14/2015	236.6	1.004	340,676	342,025.0						
6/15/2015	229.9	1.004	331,022	332,298.0						
6/16/2015	236.6	1.003	340,681	341,795.9						
6/17/2015	234.7	1.003	337,898	339,074.9						
6/18/2015	236.1	1.004	339,979	341,204.6						
6/19/2015	239.9	1.052	345,390	363,263.8						
6/20/2015	237.6	1.126	342,123	385,160.3						
6/21/2015	237.5	1.021	341,949	349,207.7						
6/22/2015	122.9	1.003	177,016	177,557.8						
6/23/2015	310.3	1.120	446,792	500,480.7						
6/24/2015	106.4	1.119	153,259	171,505.5						
6/25/2015	0.2	1.119	219	244.8						
6/26/2015	0.0	1.119	0	0.0						
6/27/2015	0.0	1.119	0	0.0						
6/28/2015	136.1	1.118	195,983	219,171.7						
6/29/2015	226.8	1.122	326,587	366,276.8						
6/30/2015	117.9	1.113	169,772	188,894.7	7,957,236	8,484,800	1.066	22,400,477	23,662,719	1.056
7/1/2015	228.5	1.114	329,104	366,587.3						
7/2/2015	234.8	1.115	338,183	377,063.2						
7/3/2015	225.8	1.005	325,158	326,724.4						
7/4/2015	238.4	1.121	343,333	385,042.1						
7/5/2015	155.7	1.123	224,185	251,694.3						
7/6/2015	0.0	1.123	0	0.0						
7/7/2015	0.0	1.122	0	0.0						
7/8/2015	27.9	1.120	40,140	44,973.4						
7/9/2015	215.4	1.122	310,122	347,848.0						
7/10/2015	191.5	1.033	275,818	284,921.9						
7/11/2015	127.7	1.006	183,909	185,062.5						
7/12/2015	153.6	1.096	221,129	242,312.4						
7/13/2015	218.4	1.106	314,459	347,694.3						
7/14/2015	229.9	1.108	331,011	366,604.4						
7/15/2015	229.9	1.108	331,025	366,915.7						
7/16/2015	103.4	1.109	148,895	165,054.2						
7/17/2015	169.5	1.010	244,029	246,406.2						
7/18/2015	159.4	1.006	229,477	230,964.7						
7/19/2015	146.7	1.110	211,298	234,453.7						
7/20/2015	164.9	1.109	237,413	263,397.0						
7/21/2015	118.4	1.104	170,429	188,092.2						
7/22/2015	202.9	1.114	292,116	325,344.0						
7/23/2015	312.1	1.113	449,495	500,127.0						
7/24/2015	112.1	1.104	161,368	178,228.9						
7/25/2015	222.8	1.099	320,899	352,755.2						
7/26/2015	152.7	1.105	219,828	242,972.8						
7/27/2015	225.9	1.006	325,311	327,178.9						
7/28/2015	228.8	1.098	329,491	361,731.3						
7/29/2015	44.3	1.103	63,859	70,417.0						
7/30/2015	0.0	1.103	0	0.0						
7/31/2015	0.0	1.103	0	0.0	6,971,483	7,580,567	1.087	23,134,495	24,742,180	1.069

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2015	0.0	1.106	0	0.0						
8/2/2015	0.0	1.106	0	0.0						
8/3/2015	84.8	1.108	122,164	135,363.6						
8/4/2015	217.1	1.095	312,624	342,398.1						
8/5/2015	94.6	1.069	136,247	145,696.2						
8/6/2015	165.6	1.064	238,406	253,697.8						
8/7/2015	142.5	1.108	205,234	227,469.5						
8/8/2015	151.9	1.112	218,782	243,352.1						
8/9/2015	199.9	1.115	287,864	320,835.2						
8/10/2015	201.0	1.087	289,498	314,642.8						
8/11/2015	44.0	1.132	63,292	71,678.0						
8/12/2015	0.0	1.106	0	0.0						
8/13/2015	104.9	1.062	151,045	160,368.6						
8/14/2015	217.7	1.103	313,526	345,740.6						
8/15/2015	205.4	1.124	295,774	332,465.4						
8/16/2015	128.5	1.078	184,993	199,382.5						
8/17/2015	0.0	1.105	0	0.0						
8/18/2015	0.0	1.106	41	45.4						
8/19/2015	0.0	1.105	0	0.0						
8/20/2015	203.0	1.108	292,316	323,805.2						
8/21/2015	201.0	1.028	289,416	297,411.8						
8/22/2015	215.6	1.013	310,402	314,292.7						
8/23/2015	360.1	1.156	518,530	599,529.3						
8/24/2015	99.4	1.145	143,151	163,916.6						
8/25/2015	209.2	1.108	301,304	333,740.6						
8/26/2015	219.8	1.076	316,557	340,710.6						
8/27/2015	138.4	1.073	199,346	213,851.1						
8/28/2015	209.9	1.125	302,251	339,953.2						
8/29/2015	111.8	1.118	160,977	179,975.8						
8/30/2015	209.8	1.141	302,111	344,836.2						
8/31/2015	163.4	1.076	235,230	253,083.2	6,191,082	6,798,242	1.098	21,119,801	22,863,609	1.083
9/1/2015	12.3	1.007	17,756	17,875.5						
9/2/2015	0.5	1.006	712	716.2						
9/3/2015	1.3	1.007	1,921	1,934.2						
9/4/2015	0.0	1.006	11	10.7						
9/5/2015	72.4	1.006	104,296	104,910.7						
9/6/2015	219.1	1.005	315,498	317,042.3						
9/7/2015	141.7	1.004	204,009	204,813.9						
9/8/2015	0.9	1.087	1,341	1,456.7						
9/9/2015	2.6	1.075	3,816	4,102.0						
9/10/2015	35.5	1.070	51,122	54,701.0						
9/11/2015	222.9	1.032	321,026	331,349.5						
9/12/2015	213.2	1.002	307,045	307,805.6						
9/13/2015	227.5	1.002	327,533	328,239.9						
9/14/2015	208.5	1.003	300,205	301,059.5						
9/15/2015	205.8	1.002	296,362	297,033.2						
9/16/2015	209.2	1.062	301,188	319,720.5						
9/17/2015	226.4	1.071	326,044	349,228.1						
9/18/2015	43.8	1.126	63,028	70,976.1						
9/19/2015	0.0	1.114	0	0.0						
9/20/2015	0.0	1.133	0	0.0						
9/21/2015	0.0	1.133	0	0.0						
9/22/2015	197.2	1.133	284,020	321,811.7						
9/23/2015	322.8	1.008	464,860	468,557.5						
9/24/2015	0.0	1.118	0	0.0						
9/25/2015	0.0	1.129	0	0.0						
9/26/2015	0.0	1.131	0	0.0						
9/27/2015	0.0	1.132	0	0.0						
9/28/2015	102.9	1.132	148,114	167,657.7						
9/29/2015	213.4	1.034	307,235	317,666.7						
9/30/2015	89.3	1.174	128,608	150,952.9	4,275,748	4,439,622	1.038	17,438,313	18,818,431	1.079

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2015	196.0	1.170	282,189	330,161.5						
10/2/2015	202.3	1.027	291,341	299,207.2						
10/3/2015	220.0	1.118	316,795	354,109.6						
10/4/2015	203.8	1.109	293,538	325,457.9						
10/5/2015	211.0	1.109	303,865	337,068.9						
10/6/2015	165.2	1.094	237,915	260,354.7						
10/7/2015	187.4	1.112	269,836	300,100.5						
10/8/2015	106.5	1.134	153,365	173,933.2						
10/9/2015	193.2	1.134	278,229	315,557.9						
10/10/2015	143.3	1.114	206,346	229,966.4						
10/11/2015	213.4	1.134	307,291	348,612.4						
10/12/2015	160.9	1.116	231,752	258,540.2						
10/13/2015	210.7	1.007	303,352	305,464.7						
10/14/2015	215.7	1.023	310,571	317,755.3						
10/15/2015	203.4	1.167	292,947	341,731.5						
10/16/2015	193.6	1.169	278,744	325,765.0						
10/17/2015	138.7	1.083	199,752	216,385.7						
10/18/2015	0.0	1.007	0	0.0						
10/19/2015	0.0	1.006	0	0.0						
10/20/2015	0.0	1.007	0	0.0						
10/21/2015	0.0	1.005	0	0.0						
10/22/2015	0.0	1.007	0	0.0						
10/23/2015	93.7	1.007	134,950	135,930.4						
10/24/2015	193.1	1.004	278,043	279,122.8						
10/25/2015	198.4	1.003	285,723	286,581.2						
10/26/2015	209.6	1.003	301,840	302,605.8						
10/27/2015	225.8	1.003	325,178	326,067.4						
10/28/2015	209.0	1.109	301,027	333,791.1						
10/29/2015	215.4	1.036	310,240	321,306.7						
10/30/2015	180.5	1.104	259,986	287,075.5						
10/31/2015	211.1	1.116	303,947	339,188.7	7,058,762	7,651,842	1.084	17,525,592	18,889,706	1.078
11/1/2015	273.5	1.128	393,801	444,395.3						
11/2/2015	216.4	1.003	311,645	312,712.1						
11/3/2015	239.9	1.001	345,432	345,729.8						
11/4/2015	215.8	1.001	310,687	310,954.9						
11/5/2015	255.1	1.001	367,327	367,709.9						
11/6/2015	253.4	1.003	364,926	365,907.3						
11/7/2015	252.3	1.002	363,306	364,096.2						
11/8/2015	222.8	1.001	320,802	321,112.6						
11/9/2015	229.6	1.003	330,561	331,465.1						
11/10/2015	160.7	1.004	231,444	232,360.7						
11/11/2015	218.6	1.012	314,827	318,573.8						
11/12/2015	113.8	1.002	163,878	164,282.8						
11/13/2015	61.6	1.042	88,729	92,428.0						
11/14/2015	207.7	1.104	299,045	330,211.2						
11/15/2015	231.6	1.012	333,487	337,623.7						
11/16/2015	222.5	1.123	320,396	359,891.9						
11/17/2015	220.0	1.124	316,743	356,105.3						
11/18/2015	221.5	1.052	318,930	335,490.2						
11/19/2015	224.4	1.161	323,091	374,959.1						
11/20/2015	224.0	1.130	322,599	364,419.4						
11/21/2015	220.1	1.129	316,895	357,839.4						
11/22/2015	222.7	1.004	320,684	322,032.5						
11/23/2015	223.4	1.003	321,747	322,852.7						
11/24/2015	208.9	1.116	300,880	335,891.6						
11/25/2015	184.1	1.118	265,140	296,301.9						
11/26/2015	190.1	1.118	273,758	306,019.8						
11/27/2015	121.2	1.118	174,515	195,090.5						
11/28/2015	221.2	1.123	318,489	357,796.0						
11/29/2015	231.5	1.123	333,334	374,490.7						
11/30/2015	102.9	1.114	148,152	165,049.2	8,915,250	9,463,793	1.062	20,249,761	21,555,258	1.064

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2015	213.9	1.127	308,036	347,301.3						
12/2/2015	36.9	1.132	53,114	60,108.2						
12/3/2015	0.0	1.131	0	0.0						
12/4/2015	0.0	1.132	0	0.0						
12/5/2015	0.0	1.130	0	0.0						
12/6/2015	170.4	1.131	245,429	277,472.7						
12/7/2015	186.9	1.004	269,111	270,230.2						
12/8/2015	217.7	1.111	313,496	348,177.7						
12/9/2015	149.1	1.112	214,648	238,768.2						
12/10/2015	105.3	1.130	151,641	171,418.6						
12/11/2015	193.7	1.112	278,940	310,065.0						
12/12/2015	197.8	1.112	284,891	316,842.1						
12/13/2015	219.1	1.112	315,518	350,920.7						
12/14/2015	112.3	1.003	161,722	162,128.9						
12/15/2015	45.9	1.004	66,133	66,379.5						
12/16/2015	228.1	1.004	328,403	329,647.0						
12/17/2015	209.2	1.120	301,191	337,281.8						
12/18/2015	208.3	1.133	299,986	339,790.8						
12/19/2015	214.9	1.133	309,519	350,734.2						
12/20/2015	127.6	1.008	183,770	185,252.5						
12/21/2015	208.5	1.009	300,300	302,975.1						
12/22/2015	197.0	1.101	283,677	312,465.7						
12/23/2015	193.5	1.111	278,651	309,540.9						
12/24/2015	213.9	1.011	307,995	311,497.2						
12/25/2015	100.3	1.013	144,429	146,239.7						
12/26/2015	0.0	1.122	0	0.0						
12/27/2015	0.0	1.121	23	25.8						
12/28/2015	185.9	1.120	267,652	299,800.5						
12/29/2015	205.0	1.120	295,174	330,659.5						
12/30/2015	210.3	1.106	302,785	334,786.0						
12/31/2015	212.8	1.116	306,439	341,906.9	6,572,673	7,152,417	1.088	22,546,685	24,268,053	1.076
1/1/2016	136.5	1.116	196,512	219,225.4						
1/2/2016	198.7	1.014	286,135	290,021.6						
1/3/2016	125.2	1.105	180,222	199,089.3						
1/4/2016	200.8	1.115	289,203	322,581.9						
1/5/2016	67.6	1.113	97,384	108,435.5						
1/6/2016	0.0	1.113	0	0.0						
1/7/2016	150.6	1.113	216,793	241,395.5						
1/8/2016	203.4	1.114	292,836	326,083.7						
1/9/2016	200.0	1.025	288,006	295,149.1						
1/10/2016	172.9	1.025	249,044	255,258.6						
1/11/2016	175.3	1.113	252,371	280,904.1						
1/12/2016	205.0	1.127	295,207	332,729.6						
1/13/2016	93.1	1.128	134,062	151,159.9						
1/14/2016	200.0	1.129	288,049	325,089.2						
1/15/2016	112.9	1.006	162,622	163,556.9						
1/16/2016	192.3	1.129	276,861	312,477.2						
1/17/2016	197.2	1.151	283,908	326,900.5						
1/18/2016	155.0	1.036	223,213	231,272.3						
1/19/2016	106.6	1.137	153,534	174,618.1						
1/20/2016	207.5	1.144	298,756	341,763.1						
1/21/2016	82.1	1.142	118,208	135,045.3						
1/22/2016	41.9	1.143	60,349	68,972.9						
1/23/2016	225.0	1.075	323,991	348,378.5						
1/24/2016	204.4	1.074	294,286	316,143.2						
1/25/2016	153.8	1.135	221,482	251,489.3						
1/26/2016	84.4	1.021	121,494	124,070.3						
1/27/2016	87.3	1.095	125,664	137,556.3						
1/28/2016	133.0	1.094	191,529	209,512.4						
1/29/2016	205.0	1.128	295,193	332,979.8						
1/30/2016	211.3	1.129	304,251	343,376.8						
1/31/2016	204.5	1.086	294,517	319,742.4	6,815,682	7,484,979	1.098	22,303,605	24,101,189	1.081

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/1/2016	203.3	1.123	292,823	328,737.7						
2/2/2016	222.0	1.023	319,659	326,880.1						
2/3/2016	96.2	1.103	138,516	152,739.8						
2/4/2016	0.0	1.126	0	0.0						
2/5/2016	108.5	1.147	156,223	179,257.9						
2/6/2016	208.5	1.014	300,263	304,371.2						
2/7/2016	122.2	1.110	175,915	195,216.2						
2/8/2016	198.7	1.129	286,065	322,881.0						
2/9/2016	116.2	1.128	167,376	188,764.6						
2/10/2016	97.1	1.128	139,758	157,713.7						
2/11/2016	162.4	1.129	233,884	264,104.6						
2/12/2016	118.8	1.019	171,139	174,426.9						
2/13/2016	126.8	1.021	182,634	186,520.3						
2/14/2016	164.7	1.109	237,196	263,129.1						
2/15/2016	130.9	1.132	188,557	213,449.2						
2/16/2016	141.6	1.132	203,854	230,741.1						
2/17/2016	201.4	1.134	289,999	328,874.2						
2/18/2016	199.5	1.131	287,346	325,003.6						
2/19/2016	215.6	1.130	310,461	350,823.1						
2/20/2016	195.9	1.009	282,042	284,716.9						
2/21/2016	199.4	1.095	287,176	314,324.8						
2/22/2016	6.6	1.106	9,450	10,453.8						
2/23/2016	160.8	1.108	231,597	256,623.4						
2/24/2016	228.2	1.011	328,616	332,215.7						
2/25/2016	218.2	1.011	314,234	317,576.2						
2/26/2016	197.9	1.086	284,938	309,442.7						
2/27/2016	191.8	1.085	276,260	299,758.7						
2/28/2016	220.3	1.084	317,238	343,989.1						
2/29/2016	175.4	1.085	252,547	273,923.3	6,665,766	7,236,659	1.086	20,054,121	21,874,054	1.091
3/1/2016	148.7	1.130	214,124	241,906.4						
3/2/2016	140.5	1.129	202,366	228,524.8						
3/3/2016	145.6	1.135	209,688	237,909.9						
3/4/2016	192.1	1.133	276,608	313,426.2						
3/5/2016	101.6	1.134	146,367	165,957.9						
3/6/2016	168.2	1.129	242,269	273,497.7						
3/7/2016	85.9	1.129	123,741	139,704.5						
3/8/2016	208.9	1.129	300,803	339,515.1						
3/9/2016	220.1	1.125	316,923	356,442.0						
3/10/2016	246.1	1.007	354,414	357,045.2						
3/11/2016	215.0	1.009	309,642	312,299.7						
3/12/2016	206.8	1.068	297,826	318,204.4						
3/13/2016	225.7	1.129	324,993	366,764.4						
3/14/2016	143.2	1.084	206,140	223,468.1						
3/15/2016	216.6	1.148	311,899	358,111.8						
3/16/2016	151.9	1.148	218,768	251,205.2						
3/17/2016	212.2	1.148	305,529	350,895.2						
3/18/2016	226.0	1.149	325,379	373,880.0						
3/19/2016	210.8	1.004	303,569	304,783.3						
3/20/2016	201.8	1.121	290,520	325,780.7						
3/21/2016	192.8	1.106	277,659	307,120.3						
3/22/2016	222.4	1.007	320,305	322,615.0						
3/23/2016	65.4	1.110	94,216	104,561.1						
3/24/2016	212.7	1.138	306,355	348,745.6						
3/25/2016	242.8	1.121	349,588	391,816.5						
3/26/2016	155.2	1.046	223,559	233,785.0						
3/27/2016	0.0	1.013	0	0.0						
3/28/2016	154.4	1.011	222,373	224,923.6						
3/29/2016	13.9	1.005	20,010	20,117.5						
3/30/2016	0.0	1.006	0	0.0						
3/31/2016	0.0	1.007	0	0.0	7,095,633	7,793,007	1.098	20,577,081	22,514,645	1.094

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/1/2016	0.0	1.005	0	0.0						
4/2/2016	161.1	1.005	231,965	233,149.4						
4/3/2016	250.0	1.004	359,972	361,466.6						
4/4/2016	10.9	1.127	15,626	17,609.1						
4/5/2016	164.8	1.139	237,245	270,286.6						
4/6/2016	206.5	1.132	297,397	336,700.7						
4/7/2016	210.8	1.133	303,517	344,017.8						
4/8/2016	148.4	1.114	213,707	238,147.4						
4/9/2016	243.1	1.121	350,051	392,555.6						
4/10/2016	229.6	1.087	330,670	359,458.1						
4/11/2016	77.4	1.086	111,505	121,048.7						
4/12/2016	0.0	1.109	0	0.0						
4/13/2016	39.7	1.110	57,139	63,424.3						
4/14/2016	202.7	1.089	291,938	317,874.1						
4/15/2016	0.0	1.003	0	0.0						
4/16/2016	131.6	1.004	189,461	190,309.2						
4/17/2016	217.6	1.003	313,330	314,419.4						
4/18/2016	221.8	1.124	319,342	359,042.0						
4/19/2016	239.5	1.125	344,868	388,049.6						
4/20/2016	239.6	1.004	345,092	346,328.5						
4/21/2016	232.1	1.003	334,270	335,115.7						
4/22/2016	232.3	1.002	334,454	334,998.8						
4/23/2016	220.2	1.002	317,114	317,815.5						
4/24/2016	219.7	1.092	316,419	345,414.4						
4/25/2016	108.5	1.123	156,292	175,476.7						
4/26/2016	0.0	1.006	0	0.0						
4/27/2016	127.0	1.006	182,888	184,024.1						
4/28/2016	212.4	1.011	305,787	309,185.2						
4/29/2016	218.4	1.047	314,503	329,155.7						
4/30/2016	56.0	1.121	80,663	90,428.6	6,655,215	7,075,502	1.063	20,416,614	22,105,168	1.083
5/1/2016	110.9	1.123	159,630	179,232.9						
5/2/2016	40.9	1.011	58,825	59,475.6						
5/3/2016	143.3	1.011	206,322	208,580.6						
5/4/2016	237.1	1.125	341,452	384,298.8						
5/5/2016	15.3	1.127	22,069	24,882.1						
5/6/2016	151.5	1.127	218,133	245,926.9						
5/7/2016	94.5	1.113	136,117	151,555.9						
5/8/2016	0.0	1.113	0	0.0						
5/9/2016	215.8	1.114	310,725	346,133.4						
5/10/2016	176.5	1.135	254,185	288,557.4						
5/11/2016	30.0	1.014	43,136	43,751.9						
5/12/2016	0.0	1.012	0	0.0						
5/13/2016	157.4	1.012	226,678	229,363.7						
5/14/2016	186.4	1.122	268,451	301,120.4						
5/15/2016	225.7	1.056	324,938	343,035.7						
5/16/2016	225.0	1.004	323,963	325,192.4						
5/17/2016	229.7	1.003	330,757	331,663.9						
5/18/2016	213.0	1.003	306,680	307,716.0						
5/19/2016	185.0	1.081	266,409	287,947.6						
5/20/2016	204.4	1.132	294,291	333,262.2						
5/21/2016	218.0	1.025	313,881	321,616.0						
5/22/2016	236.9	1.104	341,079	376,592.1						
5/23/2016	240.0	1.053	345,584	363,996.4						
5/24/2016	229.0	1.131	329,780	373,070.9						
5/25/2016	177.4	1.013	255,399	258,641.5						
5/26/2016	196.7	1.085	283,245	307,264.7						
5/27/2016	225.5	1.111	324,668	360,757.8						
5/28/2016	233.4	1.003	336,138	337,182.0						
5/29/2016	190.7	1.096	274,565	300,952.3						
5/30/2016	206.4	1.123	297,207	333,842.2						
5/31/2016	127.8	1.004	184,019	184,834.4	7,378,326	7,910,448	1.072	21,129,174	22,778,957	1.078

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/1/2016	0.0	1.002	0	0.0						
6/2/2016	209.5	1.003	301,689	302,500.2						
6/3/2016	176.7	1.001	254,382	254,569.0						
6/4/2016	240.9	1.002	346,863	347,483.2						
6/5/2016	144.4	1.002	207,983	208,376.9						
6/6/2016	234.3	1.002	337,398	338,108.6						
6/7/2016	131.3	1.099	189,137	207,951.8						
6/8/2016	219.7	1.010	316,400	319,698.2						
6/9/2016	218.3	1.056	314,356	331,962.1						
6/10/2016	204.6	1.037	294,614	305,563.6						
6/11/2016	226.3	1.004	325,900	327,344.1						
6/12/2016	41.7	1.102	59,985	66,098.0						
6/13/2016	235.0	1.112	338,351	376,374.2						
6/14/2016	45.4	1.095	65,332	71,566.7						
6/15/2016	0.0	1.112	0	0.0						
6/16/2016	94.5	1.113	136,018	151,389.9						
6/17/2016	213.2	1.128	307,030	346,350.4						
6/18/2016	236.5	1.009	340,561	343,504.5						
6/19/2016	232.5	1.137	334,771	380,743.4						
6/20/2016	229.2	1.013	330,075	334,455.8						
6/21/2016	113.4	1.005	163,308	164,143.0						
6/22/2016	215.3	1.076	310,039	333,474.8						
6/23/2016	237.8	1.013	342,428	346,882.0						
6/24/2016	225.4	1.140	324,619	370,188.4						
6/25/2016	241.8	1.007	348,154	350,759.6						
6/26/2016	154.6	1.124	222,578	250,157.2						
6/27/2016	159.8	1.016	230,141	233,826.5						
6/28/2016	208.9	1.094	300,788	328,938.7						
6/29/2016	230.9	1.108	332,467	368,270.0						
6/30/2016	148.3	1.024	213,512	218,683.0	7,588,879	7,979,364	1.051	21,622,420	22,965,313	1.062
7/1/2016	0.0	1.009	0	0.0						
7/2/2016	0.0	1.007	0	0.0						
7/3/2016	140.7	1.007	202,641	204,051.6						
7/4/2016	100.8	1.143	145,106	165,850.5						
7/5/2016	0.0	1.153	0	0.0						
7/6/2016	105.5	1.151	151,856	174,796.4						
7/7/2016	168.5	1.137	242,701	276,044.5						
7/8/2016	230.1	1.139	331,273	377,482.6						
7/9/2016	229.6	1.063	330,597	351,376.7						
7/10/2016	136.5	1.007	196,559	197,906.4						
7/11/2016	198.2	1.123	285,431	320,514.8						
7/12/2016	159.4	1.135	229,493	260,455.0						
7/13/2016	126.5	1.119	182,213	203,812.0						
7/14/2016	126.2	1.121	181,750	203,820.1						
7/15/2016	178.8	1.124	257,493	289,548.6						
7/16/2016	235.9	1.125	339,756	382,122.2						
7/17/2016	238.2	1.124	343,076	385,476.8						
7/18/2016	129.0	1.011	185,753	187,749.7						
7/19/2016	109.7	1.005	157,967	158,826.0						
7/20/2016	234.9	1.152	338,223	389,494.2						
7/21/2016	6.8	1.006	9,798	9,858.4						
7/22/2016	86.2	1.007	124,140	125,049.3						
7/23/2016	174.6	1.116	251,451	280,741.0						
7/24/2016	186.7	1.133	268,864	304,753.0						
7/25/2016	201.0	1.132	289,488	327,779.2						
7/26/2016	209.3	1.005	301,421	302,946.2						
7/27/2016	226.4	1.006	326,081	328,057.1						
7/28/2016	225.2	1.003	324,228	325,306.1						
7/29/2016	212.9	1.101	306,545	337,589.4						
7/30/2016	222.0	1.004	319,652	321,068.4						
7/31/2016	224.0	1.019	322,560	328,827.7	6,946,116	7,521,304	1.083	21,913,321	23,411,115	1.068

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/1/2016	231.9	1.045	333,922	348,793.9						
8/2/2016	0.0	1.115	0	0.0						
8/3/2016	158.2	1.111	227,736	252,909.3						
8/4/2016	99.2	1.149	142,859	164,101.6						
8/5/2016	172.1	1.174	247,797	290,994.2						
8/6/2016	191.3	1.176	275,476	323,990.9						
8/7/2016	189.5	1.070	272,883	292,015.6						
8/8/2016	168.1	1.137	242,087	275,305.9						
8/9/2016	194.1	1.134	279,548	317,100.2						
8/10/2016	213.4	1.134	307,327	348,529.4						
8/11/2016	221.1	1.007	318,449	320,632.0						
8/12/2016	55.6	1.145	80,102	91,683.9						
8/13/2016	154.0	1.146	221,745	254,097.8						
8/14/2016	237.1	1.121	341,407	382,647.3						
8/15/2016	221.2	1.004	318,503	319,796.1						
8/16/2016	83.2	1.003	119,809	120,143.9						
8/17/2016	175.3	1.004	252,422	253,379.9						
8/18/2016	55.5	1.004	79,856	80,167.5						
8/19/2016	232.2	1.002	334,404	335,163.8						
8/20/2016	87.3	1.004	125,661	126,111.2						
8/21/2016	178.3	1.004	256,682	257,615.3						
8/22/2016	71.2	1.003	102,488	102,752.7						
8/23/2016	250.1	1.003	360,075	361,083.9						
8/24/2016	100.5	1.002	144,695	145,016.1						
8/25/2016	0.0	1.002	0	0.0						
8/26/2016	163.2	1.003	234,969	235,762.7						
8/27/2016	219.5	1.131	316,137	357,685.0						
8/28/2016	20.9	1.133	30,056	34,058.2						
8/29/2016	65.6	1.136	94,459	107,305.4						
8/30/2016	97.6	1.032	140,546	145,058.4						
8/31/2016	180.7	1.003	260,169	261,018.5	6,462,269	6,904,921	1.068	20,997,264	22,405,588	1.067
9/1/2016	174.0	1.004	250,512	251,462.7						
9/2/2016	211.3	1.079	304,281	328,272.9						
9/3/2016	165.3	1.118	237,964	265,957.1						
9/4/2016	160.2	1.130	230,673	260,662.1						
9/5/2016	215.2	1.131	309,847	350,439.1						
9/6/2016	194.8	1.143	280,500	320,717.5						
9/7/2016	126.3	1.047	181,826	190,326.2						
9/8/2016	206.9	1.093	297,967	325,806.4						
9/9/2016	130.2	1.110	187,440	208,129.3						
9/10/2016	133.6	1.153	192,324	221,669.4						
9/11/2016	167.2	1.154	240,779	277,771.3						
9/12/2016	202.3	1.143	291,367	332,957.3						
9/13/2016	221.1	1.108	318,371	352,909.2						
9/14/2016	109.2	1.122	157,274	176,495.9						
9/15/2016	224.3	1.110	323,006	358,658.8						
9/16/2016	207.7	1.178	299,034	352,406.8						
9/17/2016	164.7	1.162	237,201	275,593.2						
9/18/2016	203.1	1.162	292,430	339,761.3						
9/19/2016	217.1	1.131	312,683	353,698.6						
9/20/2016	238.5	1.015	343,488	348,660.9						
9/21/2016	128.6	1.153	185,136	213,530.5						
9/22/2016	0.0	1.158	17	19.7						
9/23/2016	0.0	1.158	0	0.0						
9/24/2016	132.5	1.158	190,752	220,861.8						
9/25/2016	69.2	1.004	99,623	100,027.5						
9/26/2016	161.7	1.005	232,822	233,926.0						
9/27/2016	219.3	1.115	315,852	352,225.2						
9/28/2016	131.1	1.136	188,790	214,495.5						
9/29/2016	0.0	1.134	0	0.0						
9/30/2016	0.0	1.134	0	0.0	6,501,959	7,227,442	1.112	19,910,344	21,653,666	1.088

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/1/2016	18.6	1.139	26,722	30,446.1						
10/2/2016	223.8	1.135	322,338	365,785.3						
10/3/2016	86.3	1.012	124,264	125,742.0						
10/4/2016	162.7	1.006	234,312	235,755.1						
10/5/2016	75.9	1.107	109,315	121,041.4						
10/6/2016	224.2	1.112	322,872	358,881.9						
10/7/2016	229.1	1.004	329,934	331,253.7						
10/8/2016	142.5	1.157	205,271	237,584.1						
10/9/2016	127.4	1.158	183,458	212,529.3						
10/10/2016	221.1	1.137	318,314	361,815.0						
10/11/2016	104.2	1.143	150,081	171,591.4						
10/12/2016	0.0	1.146	0	0.0						
10/13/2016	45.1	1.146	64,882	74,331.6						
10/14/2016	223.7	1.155	322,118	372,033.7						
10/15/2016	225.9	1.008	325,224	327,744.2						
10/16/2016	213.3	1.127	307,168	346,264.0						
10/17/2016	88.9	1.137	127,974	145,501.4						
10/18/2016	157.1	1.133	226,252	256,430.6						
10/19/2016	232.6	1.124	334,922	376,401.4						
10/20/2016	225.4	1.134	324,622	368,259.0						
10/21/2016	0.0	1.003	264,998	265,749.0						
10/22/2016	0.0	1.121	124,353	139,458.2						
10/23/2016	0.0	1.124	0	0.0						
10/24/2016	0.0	1.124	0	0.0						
10/25/2016	0.0	1.122	0	0.0						
10/26/2016	0.0	1.124	597	671.0						
10/27/2016	0.0	1.122	0	0.0						
10/28/2016	0.0	1.122	0	0.0						
10/29/2016	198.7	1.124	286,057	321,545.2						
10/30/2016	228.8	1.137	329,481	374,672.3						
10/31/2016	187.7	1.013	270,298	273,840.5	5,635,827	6,195,328	1.099	18,600,055	20,327,690	1.093
11/1/2016	27.7	1.005	39,959	40,140.3						
11/2/2016	130.3	1.045	187,585	195,989.2						
11/3/2016	127.5	1.157	183,531	212,406.3						
11/4/2016	222.8	1.162	320,850	372,781.2						
11/5/2016	161.3	1.134	232,206	263,397.1						
11/6/2016	256.0	1.132	368,622	417,185.0						
11/7/2016	248.9	1.185	358,351	424,743.4						
11/8/2016	219.3	1.142	315,796	360,724.9						
11/9/2016	195.1	1.116	280,952	313,455.1						
11/10/2016	223.7	1.122	322,075	361,231.6						
11/11/2016	169.8	1.016	244,484	248,488.2						
11/12/2016	192.0	1.119	276,415	309,279.1						
11/13/2016	208.3	1.137	299,949	341,073.8						
11/14/2016	108.2	1.138	155,817	177,279.5						
11/15/2016	243.8	1.133	351,016	397,573.4						
11/16/2016	230.3	1.127	331,652	373,736.6						
11/17/2016	209.4	1.007	301,516	303,644.7						
11/18/2016	97.3	1.102	140,047	154,289.2						
11/19/2016	98.0	1.122	141,182	158,367.8						
11/20/2016	163.6	1.141	235,560	268,709.9						
11/21/2016	43.3	1.151	62,287	71,665.9						
11/22/2016	0.0	1.138	0	0.0						
11/23/2016	177.4	1.139	255,396	290,843.7						
11/24/2016	143.3	1.004	206,319	207,100.5						
11/25/2016	0.0	1.005	0	0.0						
11/26/2016	0.0	1.004	0	0.0						
11/27/2016	0.0	1.004	0	0.0						
11/28/2016	0.0	1.006	0	0.0						
11/29/2016	155.0	1.006	223,270	224,506.2						
11/30/2016	0.0	1.004	0	0.0	5,834,837	6,488,613	1.112	17,972,623	19,911,382	1.108

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
12/1/2016	166.6	1.003	239,949	240,603.6						
12/2/2016	173.9	1.075	250,363	269,034.1						
12/3/2016	231.7	1.116	333,704	372,322.9						
12/4/2016	236.2	1.036	340,159	352,312.2						
12/5/2016	226.1	1.060	325,541	344,950.4						
12/6/2016	201.5	1.118	290,177	324,292.8						
12/7/2016	229.1	1.098	329,885	362,143.8						
12/8/2016	229.8	1.130	330,939	374,018.3						
12/9/2016	118.4	1.004	170,561	171,191.4						
12/10/2016	241.2	1.037	347,344	360,331.9						
12/11/2016	148.7	1.175	214,153	251,657.0						
12/12/2016	126.6	1.117	182,369	203,794.4						
12/13/2016	217.5	1.117	313,244	350,045.2						
12/14/2016	160.4	1.120	230,997	258,657.0						
12/15/2016	236.0	1.141	339,904	387,882.1						
12/16/2016	229.9	1.141	331,091	377,724.5						
12/17/2016	171.4	1.007	246,798	248,420.9						
12/18/2016	242.2	1.107	348,735	385,883.3						
12/19/2016	51.8	1.118	74,653	83,465.5						
12/20/2016	0.6	1.118	864	966.4						
12/21/2016	33.5	1.119	48,210	53,957.9						
12/22/2016	211.6	1.119	304,724	341,022.7						
12/23/2016	100.8	1.123	145,111	162,915.5						
12/24/2016	252.9	1.126	364,245	410,125.7						
12/25/2016	232.3	1.125	334,533	376,493.8						
12/26/2016	121.5	1.005	174,997	175,938.1						
12/27/2016	200.2	1.004	288,267	289,544.3						
12/28/2016	71.6	1.099	103,127	113,353.7						
12/29/2016	203.2	1.132	292,558	331,255.2						
12/30/2016	208.7	1.154	300,472	346,649.1						
12/31/2016	201.3	1.005	289,844	291,323.9	7,887,518	8,612,278	1.092	19,358,182	21,296,218	1.100
1/1/2017	101.0	1.003	145,446	145,890.0						
1/2/2017	143.8	1.082	207,044	224,043.6						
1/3/2017	206.6	1.132	297,500	336,783.7						
1/4/2017	226.1	1.049	325,559	341,491.9						
1/5/2017	229.1	1.118	329,849	368,718.7						
1/6/2017	237.5	1.014	342,023	346,718.3						
1/7/2017	245.3	1.123	353,240	396,726.0						
1/8/2017	158.6	1.130	228,349	258,073.9						
1/9/2017	212.5	1.131	306,050	346,098.2						
1/10/2017	201.6	1.114	290,289	323,262.9						
1/11/2017	169.3	1.105	243,849	269,519.5						
1/12/2017	192.0	1.128	276,544	311,886.9						
1/13/2017	1.0	1.119	1,440	1,610.8						
1/14/2017	1.0	1.118	1,440	1,609.8						
1/15/2017	2.2	1.118	3,182	3,557.8						
1/16/2017	229.3	1.118	330,124	369,028.5						
1/17/2017	228.9	1.126	329,576	371,192.2						
1/18/2017	230.8	1.098	332,366	364,869.7						
1/19/2017	227.1	1.028	327,022	336,263.0						
1/20/2017	221.8	1.006	319,328	321,364.7						
1/21/2017	224.9	1.145	323,850	370,928.4						
1/22/2017	161.8	1.003	232,935	233,695.5						
1/23/2017	1.0	1.003	1,443	1,447.7						
1/24/2017	48.0	1.004	69,077	69,320.8						
1/25/2017	228.6	1.004	329,189	330,490.6						
1/26/2017	221.9	1.090	319,507	348,393.6						
1/27/2017	228.4	1.037	328,845	340,972.8						
1/28/2017	223.6	1.105	322,034	355,911.3						
1/29/2017	171.8	1.020	247,353	252,219.7						
1/30/2017	189.3	1.115	272,589	303,850.1						
1/31/2017	218.5	1.133	314,672	356,375.5	7,751,714	8,402,316	1.084	21,474,069	23,503,206	1.094
2/1/2017	220.3	1.107	317,192	351,251.4						
2/2/2017	11.6	1.006	16,731	16,828.0						
2/3/2017	161.0	1.005	231,815	232,886.4						
2/4/2017	200.1	1.116	288,157	321,526.2						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
2/5/2017	157.1	1.130	226,206	255,580.0						
2/6/2017	152.7	1.121	219,902	246,465.1						
2/7/2017	30.2	1.108	43,535	48,244.0						
2/8/2017	120.7	1.126	173,804	195,741.4						
2/9/2017	230.1	1.145	331,371	379,279.3						
2/10/2017	220.3	1.145	317,233	363,217.2						
2/11/2017	176.1	1.021	253,520	258,859.1						
2/12/2017	196.5	1.107	282,910	313,243.3						
2/13/2017	113.3	1.124	163,132	183,370.2						
2/14/2017	144.8	1.107	208,559	230,776.8						
2/15/2017	60.7	1.003	87,458	87,761.5						
2/16/2017	0.0	1.004	0	0.0						
2/17/2017	28.4	1.004	40,948	41,099.1						
2/18/2017	225.1	1.036	324,187	335,774.1						
2/19/2017	203.4	1.118	292,908	327,411.1						
2/20/2017	215.0	1.082	309,565	334,984.3						
2/21/2017	221.1	1.101	318,364	350,554.7						
2/22/2017	236.9	1.091	341,168	372,234.8						
2/23/2017	223.4	1.128	321,642	362,846.3						
2/24/2017	199.1	1.016	286,661	291,369.1						
2/25/2017	139.1	1.145	200,363	229,365.3						
2/26/2017	200.4	1.150	288,532	331,754.7						
2/27/2017	58.0	1.149	83,548	95,966.2						
2/28/2017	0.5	1.027	685	703.8	5,970,096	6,559,093	1.099	21,609,328	23,573,687	1.091
3/1/2017	0.7	1.020	1,030	1,050.5						
3/2/2017	0.9	1.017	1,358	1,381.4						
3/3/2017	218.4	1.050	314,542	330,171.3						
3/4/2017	218.6	1.106	314,752	348,020.0						
3/5/2017	221.8	1.105	319,386	352,940.7						
3/6/2017	225.5	1.007	324,699	326,890.4						
3/7/2017	226.8	1.011	326,578	330,088.4						
3/8/2017	207.0	1.106	298,090	329,796.0						
3/9/2017	227.8	1.006	328,096	330,103.9						
3/10/2017	208.3	1.169	299,887	350,601.8						
3/11/2017	141.1	1.089	203,196	221,249.6						
3/12/2017	197.2	1.107	284,001	314,359.0						
3/13/2017	226.7	1.105	326,437	360,643.7						
3/14/2017	225.4	1.004	324,602	325,984.2						
3/15/2017	81.9	1.003	117,941	118,294.8						
3/16/2017	162.2	1.005	233,593	234,713.1						
3/17/2017	157.4	1.004	226,641	227,559.6						
3/18/2017	203.6	1.083	293,163	317,359.8						
3/19/2017	206.0	1.130	296,666	335,110.9						
3/20/2017	43.6	1.126	62,766	70,671.6						
3/21/2017	127.3	1.125	183,359	206,241.3						
3/22/2017	213.6	1.000	307,624	307,624.0						
3/23/2017	204.8	1.060	294,973	312,782.9						
3/24/2017	199.3	1.105	286,961	317,170.0						
3/25/2017	218.3	1.110	314,335	348,966.2						
3/26/2017	202.7	1.068	291,820	311,729.7						
3/27/2017	233.5	1.102	336,265	370,604.4						
3/28/2017	213.8	1.004	307,817	309,117.8						
3/29/2017	34.6	1.124	49,830	56,011.9						
3/30/2017	93.7	1.159	134,894	156,350.2						
3/31/2017	178.4	1.068	256,850	274,356.6	7,662,152	8,197,946	1.070	21,383,962	23,159,355	1.083
4/1/2017	0.0	1.013	1	1.0						
4/2/2017	123.1	1.004	177,317	177,944.2						
4/3/2017	99.3	1.116	143,024	159,547.6						
4/4/2017	202.5	1.117	291,547	325,675.5						
4/5/2017	22.9	1.116	33,026	36,855.7						
4/6/2017	98.4	1.116	141,757	158,237.4						
4/7/2017	18.3	1.117	26,305	29,379.9						
4/8/2017	165.0	1.118	237,657	265,766.8						
4/9/2017	210.1	1.115	302,552	337,429.9						
4/10/2017	223.8	1.115	322,265	359,312.9						
4/11/2017	223.0	1.115	321,148	358,067.5						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
4/12/2017	203.5	1.003	292,972	293,804.3						
4/13/2017	94.1	1.099	135,495	148,945.9						
4/14/2017	164.7	1.119	237,120	265,401.8						
4/15/2017	229.8	1.172	330,858	387,629.9						
4/16/2017	199.8	1.079	287,741	310,415.6						
4/17/2017	147.5	1.107	212,384	235,145.8						
4/18/2017	138.5	1.127	199,389	224,650.8						
4/19/2017	159.7	1.132	230,000	260,446.9						
4/20/2017	219.5	1.009	316,060	318,873.3						
4/21/2017	210.7	1.004	303,351	304,582.6						
4/22/2017	196.0	1.125	282,215	317,596.6						
4/23/2017	182.4	1.128	262,707	296,289.9						
4/24/2017	219.4	1.010	315,963	319,074.6						
4/25/2017	213.1	1.130	306,876	346,692.9						
4/26/2017	18.6	1.006	26,721	26,880.5						
4/27/2017	0.0	1.004	1	1.0						
4/28/2017	173.9	1.005	250,399	251,654.5						
4/29/2017	55.7	1.100	80,172	88,227.4						
4/30/2017	0.5	1.133	766	868.2	6,067,789	6,605,401	1.089	19,700,037	21,362,440	1.084
5/1/2017	97.0	1.137	139,700	158,831.5						
5/2/2017	74.4	1.012	107,204	108,462.8						
5/3/2017	0.0	1.007	0	0.0						
5/4/2017	13.3	1.004	19,140	19,223.5						
5/5/2017	231.5	1.166	333,431	388,831.2						
5/6/2017	209.4	1.106	301,522	333,483.3						
5/7/2017	0.0	1.004	0	0.0						
5/8/2017	166.8	1.124	240,142	269,970.5						
5/9/2017	213.2	1.139	306,985	349,772.0						
5/10/2017	130.1	1.142	187,279	213,883.9						
5/11/2017	153.2	1.142	220,669	251,960.3						
5/12/2017	237.1	1.143	341,463	390,351.3						
5/13/2017	236.6	1.141	340,749	388,921.0						
5/14/2017	201.0	1.154	289,442	333,910.7						
5/15/2017	174.3	1.105	250,931	277,253.9						
5/16/2017	229.3	1.117	330,215	368,887.5						
5/17/2017	13.4	1.119	19,297	21,602.7						
5/18/2017	72.2	1.119	104,004	116,365.4						
5/19/2017	220.0	1.134	316,803	359,381.0						
5/20/2017	212.5	1.127	306,065	344,826.0						
5/21/2017	155.7	1.113	224,174	249,425.6						
5/22/2017	82.7	1.005	119,051	119,703.9						
5/23/2017	61.4	1.008	88,467	89,188.8						
5/24/2017	120.2	1.002	173,098	173,407.5						
5/25/2017	218.7	1.119	314,976	352,474.8						
5/26/2017	20.2	1.005	29,020	29,156.3						
5/27/2017	0.0	1.006	4	4.0						
5/28/2017	146.2	1.005	210,571	211,706.4						
5/29/2017	114.2	1.124	164,380	184,800.3						
5/30/2017	189.0	1.130	272,152	307,564.4						
5/31/2017	179.4	1.005	258,305	259,490.6	6,009,239	6,672,841	1.110	19,739,180	21,476,188	1.088
6/1/2017	141.7	1.088	204,034	221,958.0						
6/2/2017	227.6	1.019	327,696	334,063.5						
6/3/2017	241.4	1.024	347,672	355,852.7						
6/4/2017	233.8	1.009	336,646	339,591.3						
6/5/2017	215.6	1.003	310,509	311,492.1						
6/6/2017	215.0	1.003	309,636	310,520.0						
6/7/2017	220.7	1.136	317,850	361,082.0						
6/8/2017	229.8	1.015	330,879	335,862.0						
6/9/2017	219.0	1.124	315,421	354,585.6						
6/10/2017	216.6	1.105	311,921	344,528.3						
6/11/2017	220.6	1.004	317,640	318,900.4						
6/12/2017	235.8	1.003	339,572	340,687.8						
6/13/2017	172.8	1.105	248,841	275,078.3						
6/14/2017	179.6	1.114	258,576	288,125.8						
6/15/2017	214.9	1.119	309,433	346,325.5						
6/16/2017	229.2	1.100	330,060	363,000.6						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
6/17/2017	232.7	1.110	335,017	371,802.5						
6/18/2017	233.5	1.007	336,310	338,773.5						
6/19/2017	211.2	1.092	304,138	331,977.9						
6/20/2017	54.4	1.127	78,386	88,354.6						
6/21/2017	1.0	1.126	1,440	1,621.4						
6/22/2017	161.1	1.128	231,945	261,647.9						
6/23/2017	143.2	1.138	206,168	234,676.7						
6/24/2017	215.0	1.126	309,558	348,597.3						
6/25/2017	211.2	1.004	304,103	305,178.6						
6/26/2017	230.1	1.004	331,359	332,528.7						
6/27/2017	201.0	1.003	289,389	290,167.2						
6/28/2017	13.8	1.012	19,911	20,145.9						
6/29/2017	70.3	1.012	101,173	102,409.2						
6/30/2017	231.2	1.013	332,944	337,398.1	8,098,227	8,566,933	1.058	20,175,255	21,845,175	1.083
7/1/2017	218.6	1.115	314,779	351,097.6						
7/2/2017	241.1	1.129	347,166	391,789.7						
7/3/2017	216.2	1.004	311,268	312,482.3						
7/4/2017	242.0	1.126	348,410	392,293.6						
7/5/2017	203.8	1.117	293,533	327,864.9						
7/6/2017	242.4	1.004	349,067	350,544.6						
7/7/2017	236.0	1.085	339,857	368,641.5						
7/8/2017	131.4	1.136	189,247	215,006.0						
7/9/2017	210.0	1.140	302,343	344,673.1						
7/10/2017	149.1	1.035	214,730	222,268.3						
7/11/2017	215.3	1.136	309,978	352,235.8						
7/12/2017	211.1	1.019	303,946	309,787.5						
7/13/2017	199.9	1.107	287,794	318,666.2						
7/14/2017	205.6	1.009	296,126	298,934.5						
7/15/2017	7.2	1.005	10,398	10,449.1						
7/16/2017	0.0	1.004	19	19.1						
7/17/2017	148.8	1.004	214,280	215,231.0						
7/18/2017	232.0	1.003	334,085	335,160.4						
7/19/2017	5.8	1.003	8,400	8,429.3						
7/20/2017	177.4	1.003	255,451	256,259.8						
7/21/2017	227.0	1.098	326,850	358,883.6						
7/22/2017	149.3	1.093	215,008	234,927.0						
7/23/2017	159.8	1.114	230,052	256,183.6						
7/24/2017	205.8	1.130	296,365	334,770.9						
7/25/2017	1.2	1.131	1,688	1,908.4						
7/26/2017	27.7	1.129	39,904	45,056.4						
7/27/2017	216.0	1.125	310,995	349,954.0						
7/28/2017	47.0	1.116	67,647	75,469.4						
7/29/2017	163.3	1.067	235,120	250,849.8						
7/30/2017	218.2	1.004	314,196	315,538.2						
7/31/2017	57.8	1.037	83,185	86,233.1	7,151,887	7,691,609	1.075	21,259,353	22,931,383	1.079
8/1/2017	3.0	1.036	4,389	4,547.0						
8/2/2017	123.8	1.136	178,249	202,454.3						
8/3/2017	183.4	1.137	264,069	300,356.6						
8/4/2017	179.6	1.145	258,556	296,101.4						
8/5/2017	233.7	1.145	336,464	385,200.1						
8/6/2017	228.5	1.006	328,995	331,041.0						
8/7/2017	224.8	1.076	323,715	348,353.9						
8/8/2017	214.8	1.006	309,244	311,212.0						
8/9/2017	229.0	1.126	329,713	371,259.1						
8/10/2017	241.9	1.016	348,370	354,022.7						
8/11/2017	234.9	1.005	338,201	339,737.8						
8/12/2017	216.5	1.003	311,801	312,773.8						
8/13/2017	194.5	1.109	280,115	310,710.8						
8/14/2017	204.6	1.014	294,662	298,807.0						
8/15/2017	206.6	1.111	297,475	330,514.7						
8/16/2017	234.7	1.005	337,963	339,818.8						
8/17/2017	175.0	1.118	251,977	281,607.0						
8/18/2017	199.8	1.115	287,704	320,898.7						
8/19/2017	215.1	1.125	309,790	348,565.2						
8/20/2017	226.0	1.012	325,402	329,360.8						
8/21/2017	230.8	1.079	332,334	358,537.9						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
8/22/2017	218.1	1.116	314,040	350,585.1						
8/23/2017	224.2	1.093	322,891	353,056.8						
8/24/2017	92.0	1.077	132,432	142,629.3						
8/25/2017	78.6	1.100	113,179	124,544.9						
8/26/2017	219.6	1.100	316,222	347,978.3						
8/27/2017	16.5	1.100	23,698	26,077.8						
8/28/2017	1.0	1.100	1,401	1,541.7						
8/29/2017	1.0	1.100	1,440	1,584.6						
8/30/2017	1.0	1.100	1,440	1,584.6						
8/31/2017	1.0	1.100	1,380	1,518.6	7,277,311	7,826,982	1.076	22,527,425	24,085,524	1.069
9/1/2017	0.0	1.003	0	0.0						
9/2/2017	100.6	1.003	144,880	145,277.3						
9/3/2017	260.1	1.003	374,608	375,635.2						
9/4/2017	233.0	1.002	335,452	336,054.1						
9/5/2017	228.6	1.000	329,251	329,268.5						
9/6/2017	207.2	1.001	298,366	298,761.3						
9/7/2017	207.8	1.001	299,220	299,392.4						
9/8/2017	220.0	1.002	316,803	317,484.8						
9/9/2017	199.9	1.002	287,863	288,438.7						
9/10/2017	240.6	1.004	346,419	347,791.2						
9/11/2017	79.2	1.003	114,079	114,422.0						
9/12/2017	41.5	1.002	59,761	59,889.6						
9/13/2017	220.3	1.003	317,198	318,200.0						
9/14/2017	10.8	1.003	15,536	15,585.2						
9/15/2017	0.0	1.003	0	0.0						
9/16/2017	0.0	1.003	0	0.0						
9/17/2017	0.0	1.003	0	0.0						
9/18/2017	149.7	1.003	215,573	216,209.8						
9/19/2017	84.2	1.004	121,262	121,696.5						
9/20/2017	0.0	1.004	0	0.0						
9/21/2017	0.0	1.004	0	0.0						
9/22/2017	0.0	1.004	0	0.0						
9/23/2017	0.0	1.004	0	0.0						
9/24/2017	0.0	1.004	0	0.0						
9/25/2017	0.0	1.004	0	0.0						
9/26/2017	0.0	1.004	0	0.0						
9/27/2017	0.0	1.004	0	0.0						
9/28/2017	0.0	1.003	0	0.0						
9/29/2017	0.0	1.003	0	0.0						
9/30/2017	0.0	1.002	0	0.0	3,576,271	3,584,107	1.002	18,005,469	19,102,698	1.061
10/1/2017	0.0	1.001	0	0.0						
10/2/2017	20.8	1.004	30,008	30,115.5						
10/3/2017	226.9	1.004	326,698	328,007.1						
10/4/2017	179.3	1.005	258,187	259,362.0						
10/5/2017	149.8	1.003	215,762	216,510.7						
10/6/2017	112.0	1.002	161,248	161,501.0						
10/7/2017	230.9	1.002	332,516	333,319.7						
10/8/2017	20.2	1.002	29,153	29,209.8						
10/9/2017	1.0	1.003	1,440	1,445.0						
10/10/2017	1.0	1.003	1,440	1,444.6						
10/11/2017	98.1	1.002	141,321	141,670.1						
10/12/2017	66.6	1.104	95,948	105,882.2						
10/13/2017	235.3	1.034	338,861	350,490.0						
10/14/2017	164.7	1.049	237,140	248,797.6						
10/15/2017	124.2	1.115	178,815	199,416.6						
10/16/2017	103.7	1.113	149,259	166,141.1						
10/17/2017	139.4	1.126	200,764	226,048.2						
10/18/2017	201.4	1.136	290,040	329,349.1						
10/19/2017	85.0	1.095	122,353	133,926.4						
10/20/2017	211.4	1.120	304,459	341,058.6						
10/21/2017	156.0	1.006	224,570	225,905.5						
10/22/2017	48.3	1.006	69,536	69,949.5						
10/23/2017	150.6	1.024	216,924	222,130.2						
10/24/2017	198.4	1.101	285,744	314,604.1						
10/25/2017	221.8	1.134	319,370	362,163.3						
10/26/2017	221.3	1.128	318,676	359,399.0						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
10/27/2017	222.8	1.013	320,893	324,996.6						
10/28/2017	59.9	1.142	86,276	98,530.0						
10/29/2017	45.1	1.142	64,941	74,183.3						
10/30/2017	138.8	1.143	199,866	228,540.8						
10/31/2017	0.0	1.145	0	0.0	5,522,208	5,884,097	1.066	16,375,790	17,295,186	1.056
11/1/2017	2.0	1.144	2,926	3,348.4						
11/2/2017	147.2	1.145	211,936	242,756.6						
11/3/2017	114.2	1.006	164,414	165,323.2						
11/4/2017	213.7	1.112	307,765	342,283.6						
11/5/2017	164.9	1.136	237,443	269,785.6						
11/6/2017	217.3	1.136	312,974	355,457.7						
11/7/2017	222.7	1.121	320,753	359,464.4						
11/8/2017	225.7	1.004	324,948	326,196.1						
11/9/2017	210.0	1.120	302,448	338,741.8						
11/10/2017	139.4	1.134	200,678	227,641.9						
11/11/2017	81.2	1.135	116,977	132,823.9						
11/12/2017	156.4	1.013	225,236	228,068.6						
11/13/2017	170.5	1.128	245,530	276,918.8						
11/14/2017	215.4	1.118	310,137	346,585.2						
11/15/2017	51.4	1.109	74,012	82,075.9						
11/16/2017	0.0	1.108	0	0.0						
11/17/2017	0.0	1.109	0	0.0						
11/18/2017	54.3	1.109	78,145	86,684.1						
11/19/2017	213.3	1.109	307,209	340,711.1						
11/20/2017	215.4	1.122	310,119	348,066.4						
11/21/2017	182.1	1.122	262,178	294,163.7						
11/22/2017	205.1	1.035	295,395	305,874.7						
11/23/2017	221.4	1.121	318,804	357,330.8						
11/24/2017	103.8	1.119	149,519	167,281.1						
11/25/2017	173.6	1.119	249,913	279,669.4						
11/26/2017	216.3	1.126	311,411	350,620.1						
11/27/2017	130.7	1.126	188,247	212,045.9						
11/28/2017	169.1	1.126	243,456	274,042.8						
11/29/2017	146.9	1.149	211,539	243,071.0						
11/30/2017	191.2	1.148	275,320	316,169.5	6,559,432	7,273,202	1.109	15,657,911	16,741,406	1.069
12/1/2017	5.7	1.147	8,184	9,386.2						
12/2/2017	207.2	1.150	298,412	343,191.7						
12/3/2017	200.6	1.035	288,816	298,941.9						
12/4/2017	156.2	1.113	224,991	250,452.3						
12/5/2017	217.7	1.126	313,462	353,107.7						
12/6/2017	206.8	1.128	297,829	336,041.7						
12/7/2017	125.4	1.005	180,551	181,459.5						
12/8/2017	88.9	1.002	127,983	128,295.5						
12/9/2017	206.7	1.074	297,653	319,767.7						
12/10/2017	200.1	1.132	288,095	326,209.1						
12/11/2017	101.3	1.140	145,926	166,293.8						
12/12/2017	0.8	1.007	1,097	1,104.6						
12/13/2017	0.5	1.006	711	715.1						
12/14/2017	0.7	1.006	961	967.0						
12/15/2017	0.7	1.005	1,065	1,070.1						
12/16/2017	99.3	1.051	142,946	150,244.8						
12/17/2017	218.9	1.121	315,243	353,523.3						
12/18/2017	223.4	1.143	321,703	367,759.9						
12/19/2017	41.1	1.007	59,168	59,585.7						
12/20/2017	222.7	1.005	320,666	322,303.3						
12/21/2017	34.2	1.004	49,183	49,358.9						
12/22/2017	180.6	1.005	260,109	261,301.1						
12/23/2017	154.1	1.102	221,967	244,708.9						
12/24/2017	206.0	1.120	296,582	332,199.1						
12/25/2017	212.6	1.013	306,138	310,113.5						
12/26/2017	87.7	1.120	126,271	141,435.1						
12/27/2017	0.2	1.122	243	272.6						
12/28/2017	137.0	1.123	197,313	221,521.1						
12/29/2017	133.0	1.008	191,566	193,039.0						
12/30/2017	216.8	1.201	312,121	374,760.3						
12/31/2017	149.8	1.213	215,727	261,609.8	5,812,682	6,360,740	1.094	17,894,322	19,518,040	1.091

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
1/1/2018	54.9	1.215	79,106	96,122.2						
1/2/2018	129.4	1.030	186,401	192,072.1						
1/3/2018	126.6	1.004	182,311	182,982.3						
1/4/2018	67.8	1.002	97,653	97,801.0						
1/5/2018	0.0	1.007	0	0.0						
1/6/2018	110.6	1.007	159,289	160,423.1						
1/7/2018	219.9	1.112	316,681	352,254.4						
1/8/2018	213.6	1.123	307,579	345,513.3						
1/9/2018	213.8	1.008	307,854	310,302.7						
1/10/2018	143.9	1.126	207,186	233,216.0						
1/11/2018	217.2	1.131	312,825	353,774.1						
1/12/2018	207.0	1.085	298,108	323,492.5						
1/13/2018	0.1	1.007	166	167.2						
1/14/2018	7.6	1.007	10,976	11,053.5						
1/15/2018	0.0	1.041	0	0.0						
1/16/2018	63.4	1.040	91,245	94,900.3						
1/17/2018	101.0	1.014	145,503	147,469.6						
1/18/2018	0.6	1.006	836	841.3						
1/19/2018	1.0	1.006	1,411	1,419.9						
1/20/2018	4.3	1.003	6,240	6,261.4						
1/21/2018	103.3	1.003	148,724	149,209.6						
1/22/2018	108.6	1.004	156,378	157,012.9						
1/23/2018	171.8	1.004	247,403	248,368.1						
1/24/2018	117.8	1.004	169,563	170,197.5						
1/25/2018	215.5	1.031	310,263	319,735.3						
1/26/2018	212.4	1.128	305,847	345,094.8						
1/27/2018	195.6	1.124	281,699	316,560.9						
1/28/2018	212.9	1.006	306,639	308,387.8						
1/29/2018	165.6	1.003	238,419	239,047.5						
1/30/2018	219.1	1.110	315,443	350,008.0						
1/31/2018	103.1	1.120	148,535	166,383.9	5,340,283	5,680,073	1.064	17,712,397	19,314,016	1.090
2/1/2018	0.4	1.006	554	557.6						
2/2/2018	197.5	1.077	284,404	306,231.7						
2/3/2018	3.8	1.157	5,502	6,367.6						
2/4/2018	202.1	1.157	290,969	336,547.3						
2/5/2018	215.1	1.160	309,783	359,481.8						
2/6/2018	60.9	1.007	87,754	88,411.4						
2/7/2018	0.0	1.009	0	0.0						
2/8/2018	0.0	1.008	0	0.0						
2/9/2018	116.4	1.009	167,585	169,121.1						
2/10/2018	215.7	1.114	310,558	345,930.9						
2/11/2018	222.1	1.005	319,824	321,408.4						
2/12/2018	182.5	1.003	262,735	263,511.1						
2/13/2018	218.8	1.032	315,005	325,006.1						
2/14/2018	208.1	1.126	299,693	337,313.5						
2/15/2018	215.6	1.113	310,434	345,385.8						
2/16/2018	210.5	1.131	303,188	342,956.0						
2/17/2018	208.6	1.078	300,327	323,895.8						
2/18/2018	216.2	1.106	311,392	344,548.1						
2/19/2018	197.2	1.123	283,948	318,928.7						
2/20/2018	216.6	1.004	311,935	313,300.7						
2/21/2018	216.0	1.098	311,061	341,495.5						
2/22/2018	202.1	1.117	291,025	325,057.5						
2/23/2018	175.3	1.004	252,449	253,473.9						
2/24/2018	149.6	1.074	215,487	231,444.5						
2/25/2018	174.3	1.099	250,920	275,761.1						
2/26/2018	214.3	1.063	308,602	327,978.5						
2/27/2018	206.6	1.123	297,452	334,088.0						
2/28/2018	212.8	1.123	306,428	344,181.5	6,709,014	7,282,384	1.085	17,861,979	19,323,197	1.082
3/1/2018	222.2	1.057	319,952	338,339.6						
3/2/2018	211.1	1.100	303,961	334,389.3						
3/3/2018	212.0	1.010	305,226	308,231.9						
3/4/2018	216.0	1.126	311,051	350,229.1						
3/5/2018	131.2	1.095	188,943	206,883.9						
3/6/2018	215.9	1.010	310,879	313,921.9						
3/7/2018	199.6	1.121	287,414	322,234.8						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
3/8/2018	151.2	1.129	217,685	245,743.3						
3/9/2018	171.4	1.132	246,751	279,323.9						
3/10/2018	153.4	1.133	220,897	250,194.3						
3/11/2018	134.2	1.132	193,274	218,714.5						
3/12/2018	106.5	1.096	153,348	168,012.5						
3/13/2018	159.7	1.131	229,973	260,099.5						
3/14/2018	207.6	1.135	298,913	339,266.3						
3/15/2018	220.5	1.121	317,451	355,814.3						
3/16/2018	103.3	1.005	148,789	149,519.3						
3/17/2018	150.3	1.006	216,470	217,849.1						
3/18/2018	208.5	1.120	300,292	336,281.4						
3/19/2018	214.9	1.020	309,482	315,657.4						
3/20/2018	107.3	1.118	154,509	172,756.4						
3/21/2018	160.0	1.120	230,335	257,889.7						
3/22/2018	201.8	1.000	290,522	290,522.0						
3/23/2018	22.1	1.126	31,850	35,851.5						
3/24/2018	0.6	1.017	846	860.5						
3/25/2018	78.9	1.016	113,612	115,436.6						
3/26/2018	215.8	1.007	310,745	312,827.9						
3/27/2018	206.6	1.111	297,470	330,459.7						
3/28/2018	199.7	1.018	287,538	292,713.7						
3/29/2018	193.0	1.004	277,989	278,970.3						
3/30/2018	185.3	1.004	266,826	267,780.2						
3/31/2018	210.9	1.003	303,713	304,495.4	7,446,706	7,971,270	1.070	19,496,003	20,933,727	1.074
4/1/2018	78.2	1.119	112,570	125,918.1						
4/2/2018	136.0	1.126	195,845	220,438.4						
4/3/2018	199.0	1.134	286,615	324,930.3						
4/4/2018	31.5	1.006	45,392	45,654.1						
4/5/2018	0.0	1.133	0	0.0						
4/6/2018	50.5	1.132	72,775	82,412.7						
4/7/2018	214.3	1.125	308,588	347,306.5						
4/8/2018	209.7	1.144	301,968	345,401.3						
4/9/2018	218.7	1.007	314,962	317,314.8						
4/10/2018	215.5	1.119	310,385	347,466.7						
4/11/2018	196.4	1.131	282,817	319,733.1						
4/12/2018	202.5	1.011	291,569	294,809.2						
4/13/2018	141.3	1.128	203,426	229,399.8						
4/14/2018	220.5	1.139	317,469	361,595.0						
4/15/2018	219.4	1.132	315,890	357,568.5						
4/16/2018	126.9	1.181	182,696	215,772.4						
4/17/2018	0.0	1.005	0	0.0						
4/18/2018	218.1	1.004	314,054	315,445.6						
4/19/2018	217.0	1.123	312,525	350,899.3						
4/20/2018	216.6	1.122	311,931	350,000.9						
4/21/2018	79.7	1.007	114,837	115,696.4						
4/22/2018	197.2	1.006	283,897	285,722.7						
4/23/2018	221.6	1.004	319,095	320,337.6						
4/24/2018	164.0	1.116	236,123	263,488.2						
4/25/2018	141.1	1.133	203,150	230,125.9						
4/26/2018	110.7	1.004	159,344	160,039.4						
4/27/2018	153.6	1.102	221,190	243,855.3						
4/28/2018	204.0	1.138	293,809	334,354.6						
4/29/2018	34.9	1.144	50,277	57,506.6						
4/30/2018	216.3	1.141	311,497	355,535.8	6,674,696	7,318,729	1.096	20,830,416	22,572,383	1.084
5/1/2018	217.1	1.132	312,612	353,729.9						
5/2/2018	223.5	1.085	321,800	349,236.0						
5/3/2018	161.7	1.129	232,834	262,980.6						
5/4/2018	214.9	1.129	309,395	349,370.4						
5/5/2018	157.4	1.133	226,662	256,904.2						
5/6/2018	196.7	1.005	283,303	284,837.7						
5/7/2018	212.8	1.131	306,396	346,487.3						
5/8/2018	120.2	1.008	173,116	174,493.0						
5/9/2018	0.0	1.006	0	0.0						
5/10/2018	0.0	1.006	0	0.0						
5/11/2018	35.6	1.006	51,246	51,577.9						
5/12/2018	97.4	1.004	140,249	140,765.4						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
5/13/2018	0.0	1.004	0	0.0						
5/14/2018	0.0	1.006	0	0.0						
5/15/2018	0.0	1.005	0	0.0						
5/16/2018	131.1	1.026	188,760	193,737.8						
5/17/2018	220.2	1.088	317,085	345,103.9						
5/18/2018	20.1	1.137	28,975	32,952.5						
5/19/2018	155.3	1.139	223,700	254,757.2						
5/20/2018	211.0	1.145	303,841	347,879.7						
5/21/2018	9.8	1.145	14,040	16,079.4						
5/22/2018	113.2	1.144	163,051	186,494.6						
5/23/2018	220.5	1.006	317,474	319,460.8						
5/24/2018	215.8	1.005	310,775	312,361.8						
5/25/2018	182.1	1.003	262,262	262,925.5						
5/26/2018	154.2	1.106	222,053	245,684.8						
5/27/2018	215.6	1.124	310,515	349,051.8						
5/28/2018	106.2	1.006	152,943	153,853.6						
5/29/2018	202.2	1.031	291,104	300,265.0						
5/30/2018	136.7	1.120	196,870	220,567.4						
5/31/2018	138.5	1.134	199,443	226,147.2	5,860,504	6,337,705	1.081	19,981,906	21,627,705	1.082
6/1/2018	208.6	1.143	300,383	343,287.9						
6/2/2018	217.0	1.132	312,506	353,831.8						
6/3/2018	217.0	1.128	312,480	352,458.7						
6/4/2018	211.0	1.128	303,794	342,661.4						
6/5/2018	223.5	1.012	321,848	325,761.3						
6/6/2018	216.3	1.003	311,423	312,258.2						
6/7/2018	196.1	1.002	282,428	282,903.0						
6/8/2018	132.0	1.130	190,090	214,761.4						
6/9/2018	167.1	1.134	240,563	272,696.4						
6/10/2018	187.4	1.136	269,853	306,524.4						
6/11/2018	207.4	1.135	298,725	338,926.2						
6/12/2018	209.9	1.006	302,303	304,162.8						
6/13/2018	211.6	1.111	304,652	338,323.1						
6/14/2018	72.5	1.127	104,383	117,600.9						
6/15/2018	96.6	1.012	139,057	140,761.6						
6/16/2018	200.2	1.116	288,291	321,837.7						
6/17/2018	127.3	1.008	183,359	184,798.0						
6/18/2018	195.5	1.009	281,500	283,998.6						
6/19/2018	203.0	1.127	292,257	329,453.1						
6/20/2018	205.1	1.002	295,372	296,101.6						
6/21/2018	191.0	1.001	275,019	275,274.8						
6/22/2018	199.5	1.002	287,319	287,893.6						
6/23/2018	202.4	1.123	291,514	327,308.4						
6/24/2018	213.6	1.049	307,639	322,648.1						
6/25/2018	131.0	1.003	188,604	189,169.8						
6/26/2018	198.5	1.123	285,904	321,161.1						
6/27/2018	198.1	1.123	285,331	320,351.1						
6/28/2018	207.8	1.010	299,290	302,346.3						
6/29/2018	208.1	1.007	299,682	301,875.1						
6/30/2018	0.3	1.097	386	423.5	7,855,955	8,411,560	1.071	20,391,155	22,067,995	1.082
7/1/2018	1.0	1.110	1,440	1,597.8						
7/2/2018	161.0	1.110	231,780	257,324.9						
7/3/2018	185.9	1.136	267,707	304,141.7						
7/4/2018	44.5	1.011	64,111	64,816.7						
7/5/2018	199.6	1.006	287,374	289,216.1						
7/6/2018	205.5	1.004	295,920	297,009.6						
7/7/2018	184.9	1.001	266,249	266,583.9						
7/8/2018	91.6	1.000	131,846	131,900.1						
7/9/2018	207.2	1.107	298,427	330,295.4						
7/10/2018	210.6	1.011	303,222	306,539.2						
7/11/2018	210.6	1.001	303,298	303,711.7						
7/12/2018	210.2	1.002	302,656	303,261.3						
7/13/2018	207.2	1.094	298,409	326,364.6						
7/14/2018	217.1	1.145	312,579	357,820.1						
7/15/2018	215.1	1.003	309,753	310,731.5						
7/16/2018	206.3	1.139	297,030	338,382.2						
7/17/2018	211.4	1.109	304,363	337,619.2						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
7/18/2018	203.2	1.123	292,596	328,662.8						
7/19/2018	206.2	1.115	296,969	331,246.3						
7/20/2018	177.9	1.133	256,121	290,173.3						
7/21/2018	208.5	1.064	300,260	319,335.5						
7/22/2018	149.7	1.080	215,521	232,854.1						
7/23/2018	156.5	1.140	225,341	256,842.5						
7/24/2018	201.4	1.119	289,957	324,448.5						
7/25/2018	183.5	1.123	264,221	296,720.2						
7/26/2018	211.1	1.087	303,947	330,372.2						
7/27/2018	207.5	1.119	298,759	334,420.1						
7/28/2018	209.9	1.078	302,315	325,813.3						
7/29/2018	174.9	1.128	251,882	284,107.8						
7/30/2018	0.0	1.007	0	0.0						
7/31/2018	163.5	1.029	235,441	242,336.1	7,809,494	8,424,649	1.079	21,525,953	23,173,914	1.077
8/1/2018	215.9	1.139	310,861	354,085.0						
8/2/2018	92.2	1.005	132,835	133,485.1						
8/3/2018	210.5	1.076	303,110	326,224.6						
8/4/2018	90.4	1.035	130,194	134,777.5						
8/5/2018	143.9	1.006	207,287	208,573.2						
8/6/2018	203.9	1.031	293,578	302,570.0						
8/7/2018	221.6	1.007	319,131	321,364.9						
8/8/2018	212.1	1.136	305,480	346,895.8						
8/9/2018	213.1	1.121	306,847	343,975.5						
8/10/2018	220.9	1.074	318,056	341,524.7						
8/11/2018	201.8	1.002	290,613	291,176.8						
8/12/2018	209.3	1.125	301,338	339,051.1						
8/13/2018	222.2	1.014	320,001	324,514.9						
8/14/2018	211.4	1.116	304,476	339,938.3						
8/15/2018	219.7	1.021	316,369	322,996.0						
8/16/2018	212.4	1.095	305,814	334,866.3						
8/17/2018	211.2	1.053	304,193	320,315.2						
8/18/2018	212.5	1.095	305,954	335,116.9						
8/19/2018	209.8	1.131	302,120	341,569.6						
8/20/2018	129.1	1.072	185,886	199,230.4						
8/21/2018	209.7	1.094	301,897	330,243.3						
8/22/2018	112.8	1.064	162,370	172,813.3						
8/23/2018	130.9	1.069	188,511	201,439.6						
8/24/2018	111.5	1.130	160,560	181,492.4						
8/25/2018	173.6	1.128	249,963	282,009.5						
8/26/2018	209.5	1.128	301,733	340,432.7						
8/27/2018	211.4	1.130	304,362	344,056.0						
8/28/2018	211.9	1.003	305,157	306,215.9						
8/29/2018	134.9	1.153	194,261	223,921.2						
8/30/2018	179.8	1.015	258,901	262,782.7						
8/31/2018	104.5	1.004	150,525	151,150.0	8,142,383	8,758,808	1.076	23,807,832	25,595,017	1.075
9/1/2018	137.9	1.003	198,519	199,144.7						
9/2/2018	206.5	1.002	297,399	298,039.0						
9/3/2018	207.5	1.111	298,808	331,880.7						
9/4/2018	220.8	1.009	317,984	320,727.9						
9/5/2018	213.0	1.001	306,760	307,145.9						
9/6/2018	201.4	1.157	290,079	335,500.4						
9/7/2018	128.3	1.003	184,709	185,224.0						
9/8/2018	205.5	1.005	295,991	297,363.2						
9/9/2018	209.2	1.135	301,176	341,912.5						
9/10/2018	209.2	1.147	301,278	345,597.8						
9/11/2018	203.5	1.011	292,984	296,175.8						
9/12/2018	211.1	1.068	303,941	324,609.0						
9/13/2018	206.4	1.142	297,216	339,389.2						
9/14/2018	208.3	1.003	300,000	300,931.8						
9/15/2018	207.4	1.122	298,626	334,971.8						
9/16/2018	203.0	1.157	292,317	338,137.4						
9/17/2018	206.4	1.002	297,260	297,791.5						
9/18/2018	206.4	1.042	297,272	309,662.9						
9/19/2018	119.0	1.002	171,319	171,634.4						
9/20/2018	71.9	1.003	103,497	103,774.6						
9/21/2018	217.5	1.003	313,200	314,108.6						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
9/22/2018	227.9	1.002	328,195	328,697.1						
9/23/2018	234.5	1.003	337,615	338,469.2						
9/24/2018	215.1	1.003	309,717	310,646.2						
9/25/2018	219.6	1.038	316,206	328,236.4						
9/26/2018	203.5	1.129	293,024	330,899.7						
9/27/2018	212.9	1.002	306,520	307,098.4						
9/28/2018	209.7	1.054	301,972	318,418.3						
9/29/2018	206.2	1.149	296,907	341,177.6						
9/30/2018	208.9	1.011	300,819	304,096.1	8,551,310	9,001,462	1.053	24,503,187	26,184,919	1.069
10/1/2018	210.2	1.139	302,747	344,923.0						
10/2/2018	209.9	1.109	302,232	335,221.2						
10/3/2018	213.0	1.005	306,722	308,320.6						
10/4/2018	209.6	1.096	301,809	330,782.7						
10/5/2018	208.5	1.125	300,260	337,760.7						
10/6/2018	209.7	1.100	302,006	332,174.6						
10/7/2018	203.7	1.138	293,257	333,695.4						
10/8/2018	214.1	1.034	308,351	318,785.9						
10/9/2018	205.5	1.153	295,908	341,119.2						
10/10/2018	213.0	1.003	306,745	307,776.9						
10/11/2018	206.2	1.125	296,883	334,119.3						
10/12/2018	216.4	1.043	311,676	325,028.5						
10/13/2018	208.9	1.090	300,768	327,709.6						
10/14/2018	205.0	1.138	295,140	335,775.5						
10/15/2018	116.4	1.136	167,621	190,418.6						
10/16/2018	80.8	1.005	116,365	116,916.0						
10/17/2018	207.7	1.003	299,155	300,052.5						
10/18/2018	130.0	1.128	187,177	211,104.6						
10/19/2018	183.3	1.135	263,939	299,586.6						
10/20/2018	211.2	1.071	304,170	325,798.3						
10/21/2018	35.5	1.101	51,131	56,284.4						
10/22/2018	206.9	1.136	297,910	338,439.5						
10/23/2018	99.2	1.131	142,817	161,526.0						
10/24/2018	210.2	1.146	302,649	346,964.1						
10/25/2018	215.7	1.005	310,611	312,034.5						
10/26/2018	212.0	1.003	305,233	306,132.5						
10/27/2018	206.2	1.156	296,995	343,249.6						
10/28/2018	213.8	1.062	307,845	326,819.3						
10/29/2018	210.5	1.089	303,124	329,993.8						
10/30/2018	138.7	1.124	199,770	224,456.8						
10/31/2018	0.0	1.141	0	0.0	8,081,016	8,802,970	1.089	24,774,709	26,563,240	1.072
11/1/2018	204.1	1.029	293,970	302,401.6						
11/2/2018	197.7	1.056	284,724	300,785.3						
11/3/2018	205.2	1.143	295,460	337,648.1						
11/4/2018	209.3	1.027	301,325	309,396.9						
11/5/2018	180.9	1.002	260,529	261,077.7						
11/6/2018	147.3	1.117	212,063	236,874.4						
11/7/2018	205.0	1.147	295,162	338,582.1						
11/8/2018	217.1	1.061	312,612	331,530.0						
11/9/2018	228.5	1.004	329,012	330,308.3						
11/10/2018	204.8	0.999	294,943	294,688.8						
11/11/2018	37.7	1.008	54,324	54,755.0						
11/12/2018	241.1	1.008	347,136	349,889.8						
11/13/2018	452.0	1.008	650,880	656,043.4						
11/14/2018	452.0	1.008	650,880	656,043.4						
11/15/2018	452.0	1.008	650,880	656,043.4						
11/16/2018	452.4	1.008	651,411	656,578.6						
11/17/2018	452.7	1.008	651,850	657,021.1						
11/18/2018	453.0	1.008	652,280	657,454.5						
11/19/2018	452.0	1.008	650,922	656,085.8						
11/20/2018	452.1	1.008	650,998	656,162.4						
11/21/2018	268.1	1.008	386,008	389,070.2						
11/22/2018	398.1	1.008	573,232	577,779.4						
11/23/2018	264.9	1.008	381,424	384,449.8						
11/24/2018	205.4	1.005	295,740	297,173.7						
11/25/2018	166.7	1.005	240,009	241,185.3						
11/26/2018	11.0	1.005	15,890	15,970.4						

Calculation of Volume Weighted Three-month Running Average
Specific Gravity
Through Year End 2018

Appendix 6-3
Attachment A

1	2	3	4	5	6	7	8	9	10	11
Date	Calculated Injection Rate	Average Daily SG	Daily Volume Wells 1 & 2 (gallons)	Daily Calculated Volume*SG	Cumulative Monthly Volume	Cumulative Monthly Volume*SG	Monthly Weighted SG	Three Month Cumulative Volume	Three Month Cumulative Volume*SG	Three Month Running SG
11/27/2018	161.4	1.111	232,458	258,313.4						
11/28/2018	111.9	1.129	161,201	182,040.9						
11/29/2018	187.4	1.128	269,880	304,499.9						
11/30/2018	153.4	1.130	220,888	249,666.6	11,268,091	11,599,520	1.029	27,900,417	29,403,952	1.054
12/1/2018	181.7	1.123	261,593	293,732.8						
12/2/2018	192.1	1.021	276,580	282,421.4						
12/3/2018	109.6	1.133	157,871	178,835.5						
12/4/2018	181.6	1.139	261,442	297,701.1						
12/5/2018	193.9	1.149	279,238	320,933.3						
12/6/2018	172.5	1.105	248,416	274,448.8						
12/7/2018	192.8	1.007	277,598	279,574.5						
12/8/2018	187.3	0.999	269,752	269,366.0						
12/9/2018	200.2	1.127	288,280	324,891.6						
12/10/2018	194.2	1.001	279,686	279,946.9						
12/11/2018	191.6	1.004	275,928	276,931.3						
12/12/2018	207.7	1.043	299,100	312,074.4						
12/13/2018	203.7	1.004	293,355	294,594.7						
12/14/2018	181.3	1.136	261,097	296,730.7						
12/15/2018	213.6	1.070	307,593	328,994.1						
12/16/2018	178.5	1.002	257,020	257,654.8						
12/17/2018	45.1	1.130	64,987	73,407.8						
12/18/2018	47.2	1.131	67,943	76,847.1						
12/19/2018	71.8	1.133	103,439	117,207.4						
12/20/2018	60.0	1.134	86,423	97,963.1						
12/21/2018	13.6	1.134	19,636	22,263.1						
12/22/2018	0.0	1.133	0	0.0						
12/23/2018	82.9	1.133	119,404	135,323.5						
12/24/2018	0.0	1.012	0	0.0						
12/25/2018	147.9	1.079	212,943	229,789.6						
12/26/2018	177.5	1.125	255,586	287,536.0						
12/27/2018	189.9	1.008	273,499	275,734.3						
12/28/2018	186.6	1.003	268,680	269,388.2						
12/29/2018	194.5	1.004	280,019	281,037.1						
12/30/2018	63.0	1.126	90,775	102,179.6						
12/31/2018	131.6	1.126	189,528	213,457.4	6,327,411	6,750,966	1.067	25,676,518	27,153,457	1.058

APPENDIX 6-4

SASOL CHEMICALS (USA), LLC

**ANNUAL WELL PRESSURE TRANSIENT
TESTING AND REPORTING PROGRAM**

APPENDIX 6-4
ANNUAL WELL PRESSURE TRANSIENT TESTING AND REPORTING PROGRAM

APPENDIX 6-4	1
Introduction to Appendix 6-4.....	2
6-4.1 Injection/Falloff Transient Testing Surveys.....	3
6-4.3 Well-to-well pulse testing Survey	4
6-4.3 Static Bottomhole Pressure Gradient Surveys	5
6-4.4 Analysis of the Well Data	6
6-4.5 Reporting of the Test Data to This No Migration Petition Reissuance.....	7
6-4.5.1 Annual Injection Volume Compliance	7
6-4.5.2 Reservoir Transmissibility/Operational Pressure Model Comparison	9
6-4.5.3 Reservoir Mobility/Long-term Model Comparison.....	10
6-4.5.4 Reservoir Pressure Buildup Model Comparison.....	10

Introduction to Appendix 6-4

Annual pressure monitoring and reporting will be conducted in each active Injection Interval. Testing includes the Frio E&F Injection Interval Sand and the Frio A/B/C Injection Interval Sand. Testing/monitoring and reporting will follow this *Annual Well Pressure Transient Testing and Reporting Program*. The program is designed to monitor flowing bottomhole pressures and static bottomhole pressures in the current Frio E and F Sand Injection Interval and Frio A/B/C Injection Interval against conservative prediction presented in Section 3.0 Flow and Containment Modeling. The annual testing program includes the following elements:

- Injection/Falloff Transient Testing in a well solely completed in the current Frio E and F Sand Injection Interval;
- Well-to-Well interference testing in the current Frio E and F Sand Injection Interval, when more than one well is completed into the interval (currently only WDW147 is completed in this interval);
- Injection/Falloff Transient Testing in a well solely completed in Frio A/B/C Sand Injection Interval; and
- Well-to-Well interference testing in the Frio A/B/C Sand, when more than one well completed into the interval (currently only WDW319 is completed in this interval).

Detailed reservoir pressure transient testing will be performed in at least one solely completed well in each active injection interval. Data gathered from the testing will be compared to assumptions and predictions from the DuPont Model Reservoir Simulators, as detailed in this appendix and as presented in Section 3.0. If needed, static bottomhole pressures will be obtained in each active injection well, annually, if that well is a third completion into an active Injection Interval and if that well is not part of the injection/falloff test or interference (pulse well or monitoring well) testing program. This static survey may be performed prior to running the radioactive tracer survey portion of the mechanical integrity test, using a memory pressure gauge attached to bottom of radioactive tracer tool.

6-4.1 INJECTION/FALLOFF TRANSIENT TESTING SURVEYS

Sasol Chemicals, LLC Greens Bayou Plant will perform an annual injection/falloff test in the Frio E and F Sand Injection Interval and the Frio A/B/C Injection Interval. Testing will include both Plant Well Nos. 1 (WDW147) and 2 (WDW319). If the falloff test results from any of the test wells do not meet minimum quality standards, the test may be repeated.

BOTTOMHOLE PRESSURE TRANSIENT FALLOFF TEST GENERAL FIELD PROCEDURES

1. Rig up wireline lubricator containing a calibrated bottomhole pressure surface read-out gauge and a memory gauge (0 to 5,000 psi range) installed on the tool string to the crown valve. Obtain pressure readings in the lubricator.
2. Inject wastewater into the test well for at least 12-24 hours prior to shut-in to allow bottomhole pressure stabilization. Maintain steady rates of injection in the test well and offset injection well(s) that inject into the same interval during this time. Offset injection effects may be accounted for in the final well test analysis.
3. Lower bottomhole pressure tools into the wellbore while continuing to inject.
4. Position the bottomhole pressure tools above the perforations and monitor pressure and temperature to verify they are stable for approximately 15 to 30 minutes. Target gauge depth is 6,548 feet below ground level for wells completed into the Frio E and F Sand Injection Interval, or as close to that depth as practicable, based on wellbore conditions. For the Frio A/B/C Sand Injection Interval, the target gauge depth is at approximately 6,820.5 feet below ground level, or as close to that depth as practicable based on wellbore conditions.
5. Shut the well in, starting as close to the wellhead as possible. Injection should be stopped as rapidly as possible. Monitor the falloff pressure for 12 to 24 hours. Longer test durations may be required and the test should be periodically evaluated for a time sufficient to reach radial flow.

6-4.3 WELL-TO-WELL PULSE TESTING SURVEY

Sasol Chemicals, LLC Greens Bayou Plant will perform an annual well-to-well pressure pulse test when more than one well is completed into either the Frio E and F Sand Injection Interval or the Frio A/B/C Injection Interval. Currently each well is completed in only one injection interval; WDW147 in the Frio E and F and WDW319 in the Frio A/B/C. These tests will be run following completion of the annual injection/falloff test, with the surface read-out and memory gauges remaining in place. The well that is used for the injection/falloff test will then functionally become an “observation” well for the interference pulse.

The pressure pulse can be either a quick increase in the rate of injection or a quick decrease in the rate of injection, depending on site operating conditions at the time of the testing. Larger rate changes are preferable to smaller rate changes in order to increase the amplitude of resulting pressure transient. For this well-to-well pressure pulse testing scenario, the wellhead injection rate is equal to the injection rate into the selected test Injection Interval. Therefore, the well-to-well pressure pulse test can be analyzed using standard transient pressure principals. This procedure will apply if two or more wells are completed into the same interval.

Well-to-Well Pulse Interference Test General Field Procedure

1. Following confirmation of radial flow during the injection/falloff test, coordinate with the operations control room for initiation of pulse interference testing. BHP gauges to remain in place throughout the pulse testing sequence.
2. Initiate a quick increase or decrease in the offset “injector” well and maintain the rate change for at least 12-24 hours. Continue to maintain steady rate in the offset well. Offset injection effects will be accounted for in the final analysis.
3. Following completion of the testing, make pressure gradient stops at 1,000 to 1,500-foot intervals while retrieving the tools from the well

6-4.3 STATIC BOTTOMHOLE PRESSURE GRADIENT SURVEYS

The Sasol Chemicals, LLC Greens Bayou Plant will perform an annual static bottomhole pressure in each injection well.

- The initial bottomhole reference pressure value in the Frio E and F Sand Injection Interval is 2,824.2 psig set at a reference depth of 6,548 feet below ground level.
- The initial bottomhole reference pressure value in the Frio A/B/C Sand Injection Interval is 2,960.0 psig set at a reference depth of 6,820.5 feet below ground level.

These reference pressures serve as the starting point for any pressure comparisons between the model and the measured site-specific data.

Static pressure surveys may be obtained via a memory pressure gauge placed on the bottom of the radioactive tracer tool string run during the mechanical integrity testing of the well. Alternately, the surveys may be performed using a surface read-out gauge (with memory backup) on wireline. The tool string will be run into the well, making pressure gradient stops at select interval depths, while running the tool to total well depth. Testing will follow the general procedure outlined below:

Static Gradient Survey General Field Procedures

1. Shut-in well for adequate time to allow the well to reach equilibrium ahead of static gradient survey.
2. Rig up wireline lubricator containing a calibrated memory gauge (0 to 5,000 psi range) installed in the radioactive tracer tool string to the crown valve (alternate is to use a surface read-out gauge with memory gauge on the tool string). Obtain pressure readings in the lubricator.

3. Open crown valve and record surface pressure. Run the tool in hole while making 10-minute gradient stops at pre-determined depths spaced at approximately 1,000 to 1,500-foot intervals.
4. The final gradient survey depth should be at approximately 6,548 feet below ground level for wells completed into the Frio E and F Sand Injection Interval, or as close to that depth as practicable, based on wellbore conditions. For wells completed into the Frio A/B/C Sand Injection Interval, the final gradient survey depth should be at approximately 6,820.5 feet below ground level, or as close to that depth as practicable based on wellbore conditions. This final gradient stop should be made for approximately 20 minutes duration. Gradient survey depths should be verified against the well's injection packer depth.
5. Upon completion of the final static gradient survey stop, the radioactive tracer portion of the mechanical integrity test may commence. If the static gradient survey is performed using a surface read-out gauge with memory gauge on the tool string, the gauges can be pulled from the well completing the testing.

Gauge data should be reviewed, and any unusual conditions should be explained. Resulting bottomhole static pressures should be depth corrected to the modeled reference below ground level depths and reported as "psig".

6-4.4 ANALYSIS OF THE WELL DATA

The injection/falloff tests in the injection interval(s) should be analyzed following procedures outlined in EPA Region 6's *Pressure Fall-off Testing Guideline (Third Revision - August 8, 2002)* and all applicable Texas Commission on Environmental Quality (TCEQ) regulations and requirements using transient analysis and reporting software. The EPA Region 6's *Pressure Fall-off Testing Guideline (Third Revision - August 8, 2002)* is attached at the end of this Appendix for ease of reference. Transient analysis and report software can be used to identify flow regimes and derive reservoir properties, such as permeability and skin. Test analysis software allows for the identification of flow regime, computation of the pressure derivative function, and reservoir

parameter analysis (transmissibility, skin, static formation pressure, etc.) by both type-curve matching (Log-Log Plot) and superposition analysis (Semi-Log Plot). Final test interpretation should be verified through pressure history simulation with the gauge data.

At Sasol Chemicals, LLC Greens Bayou Plant, historic falloff tests have been analyzed using transient analysis and report software to estimate and derive reservoir properties. The raw measured injection/falloff test gauge data are first analyzed using conventional transient analysis techniques. For the falloff portion of the test, a log-log plot and a semi-log plot are prepared using the measured gauge data (surface read-out or memory gauge data) and the rate history for the specific well being tested. Flow regimes are identified from the log-log plot, and reservoir characteristics were then determined from both the log-log plot and the semi-log plot. In general, reservoir characteristics have been found to be in good agreement between the log-log plot and the semi-log plot.

Falloff test report requirements are specified in Section 4.0 of EPA Region 6's *Pressure Fall-off Testing Guideline (Third Revision - August 8, 2002)*, as attached.

6-4.5 REPORTING OF THE TEST DATA TO THIS NO MIGRATION PETITION REISSUANCE

6-4.5.1 Annual Injection Volume Compliance

The Sasol Chemicals, LLC Greens Bayou Plant will annually report to EPA the volume injected into the Frio E and F Sand Injection Interval and Frio A/B/C Injection Interval. The Sasol Chemicals, LLC Greens Bayou Plant is requesting monthly volume limitation in each injection interval based on the following (Petition Condition Number 2).

- The monthly injection volume limit in the Frio E and F Sand Injection Interval is set to equal the volume calculated by multiplying (the maximum annual injection rate of 750 gpm) x (1,440 minutes per day) x (number of standard days in the applicable month),
- The monthly injection volume limit in the Frio A/B/C Sand Injection Interval is set to equal the volume calculated by multiplying (the maximum annual injection rate of 750

gpm) x (1,440 minutes per day) x (number of standard days in the applicable month),

Therefore, the monthly volumes are:

Month	Frio E and F	Frio A/B/C
January (31 days)	33,480,000	33,480,000
February (28.25 days)*	30,510,000	30,510,000
March (31 days)	33,480,000	33,480,000
April (30 days)	32,400,000	32,400,000
May (31 days)	33,480,000	33,480,000
June (30 days)	32,400,000	32,400,000
July (31 days)	33,480,000	33,480,000
August (31 days)	33,480,000	33,480,000
September (30 days)	32,400,000	32,400,000
October (31 days)	33,480,000	33,480,000
November (30 days)	32,400,000	32,400,000
December (31 days)	33,480,000	33,480,000

*Takes in account 29 days every 4 years

The Sasol Chemicals, LLC Greens Bayou Plant will report actual annual injection volumes as part of its reporting to EPA. In the event that a well is completed into more than one injection interval, that well's wellhead volume will be incrementally added to the cumulative of each injection interval when calculating the annual flow. By "double" allocating all the dual-completion flows to each injection interval sand, the potential issue of flow distribution by sand is conservatively resolved.

The projected operational model term for plume volumes is based on maximum injection of 750 gpm in the Frio E and F Sand and 750 gpm in the Frio A/B/C Sand starting at the beginning of 2018 through year-end 2050. Modeled injection volume over the projected model term is:

INTERVAL	CUMULATIVE PROJECTED VOLUME
Frio E and F Sand	14.822 billion Gallons
Frio A/B/C Sand	14.889 billion Gallons

Sasol Chemicals, LLC Greens Bayou Plant will report actual cumulative injection volumes, as starting on January 1, 2018, as part of its reporting to EPA. The cumulative flow volumes for any dual-completion well completed in more than one injection interval will be added to the cumulative of each interval when calculating their cumulative flow (in the future this situation may apply). By allocating all the dual-completion flows to each injection interval sand, the potential issue of flow distribution by sand is conservatively resolved. Currently each well is solely completed in one Injection Interval.

Frio E&F Sand Cumulative Volume (Gallons)	Frio A/B/C Sand Cumulative Volume (Gallons)
2,124,897,300	1,392,128,100

The low density waste stream will not exceed the volume limit set forth by the EPA. As of year-end 2018, Sasol has injected 21 percent of the percent of the projected volume allowed.

Low Density Volume Injected through 2018 (gallons)	Low Density Volume Allowed (gallons)	Percent of Allowed Volume Injected through 2018
815,821,120	3,945,000,000	21%

6-4.5.2 Reservoir Transmissibility/Operational Pressure Model Comparison

Sasol Chemicals, LLC Greens Bayou Plant will prepare a comparison between the annual falloff test results and the operational pressure buildup model parameters used in this 2020 HWDIR

Exemption Petition Reissuance. Model parameters are summarized in Table 3-4, located in of this document. This table is reproduced in the tabulation below and will be used as the point of comparison for values obtained from falloff test analyses in the Frio E and F Sand Injection Interval and the Frio A/B/C Sand Injection Interval. The annual falloff test transmissibility should be higher than the modeled transmissibility values shown below (second column from the left):

Modeled Injection Interval Layer Transmissibilities, Flow Capacity and Mobilities

Injection Interval	Multilayer Pressure Model Transmissibility (md·ft/cp)	10,000 Year Model Mobility³ (md/cp)
Frio E and F Sand ¹	444,444.4	5,769.2
Frio A/B/C Sand ²	454,833.3	5,769.2

¹ Frio E and F Sand uses a permeability of 1,600 md, a thickness of 150 feet, and a viscosity of 0.54 centipoise to calculate transmissibility

² Frio A/B/C Sand uses a permeability of 885 md, a thickness of 150 feet, and a viscosity of 0.54 centipoise to calculate transmissibility

³ Mobility calculated from Tables in Section 3.0 (Frio E and F Sand, permeability of 3,000 md and a viscosity of 0.52 cp) (Frio A/B/C Sand, permeability of 3,000 md and a viscosity of 0.52 cp).

6-4.5.3 Reservoir Mobility/Long-term Model Comparison

Sasol Chemicals, LLC Greens Bayou Plant will prepare a comparison between the annual falloff test results with the mobilities used in the long-term plume models in this 2020 HWDIR Exemption Petition Reissuance. Mobility values are summarized in Tables located in Section 3.0 of this document, and as shown in the tabulation above. Calculated falloff test mobility should be lower than the values shown in the right-hand column.

6-4.5.4 Reservoir Pressure Buildup Model Comparison

Sasol Chemicals, LLC Greens Bayou Plant is conservatively setting flowing bottomhole pressure and static pressures to remain within the following limits:

INTERVAL	INCREMENTAL FORMATION PRESSURE INCREASE	FORMATION PRESSURE AT REFERENCE DEPTH
Frio E and F Sand	283.5 psi	2,824.3 psig @ 6,548 feet
Frio A/B/C Sand	495.2 psi	2,956.2 psig @ 6,282.5 feet

These pressures are set based on the conservatively determined incremental pressure increase (threshold pressure) calculated in Section 3.0.

6-4.5.4.1 Pressure Buildup Model Comparison to Flowing Bottomhole Pressure

The bottomhole injection pressure, at test conditions, will be adjusted so it can be compared to the injection interval compliance pressures outlined in Subsection 6-4.5.4, above. The depth and skin adjusted bottomhole flowing pressure will be calculated by correcting for elevation differences, and then subtracting the pressure due to skin from the measured pressure in the well, using the following equation:

Depth and Skin-Adjusted Injection Pressure ($P_{inj(adj)}$)

$$P_{inj(adj)} = [(D_{ref} - D_{gauge}) \times DG_{fluid}] + P_{meas} - \Delta P_{skin}$$

$P_{inj(adj)}$ = Adjusted bottomhole injection pressure, psi

D_{ref} = Reference depth, feet

D_{gauge} = Gauge depth, feet

DG = Density gradient of test fluid, psi/ft

P_{meas} = Measured pressure, psi (or Measured pressure, psia – 14.7)

$$\Delta P_{skin} = (0.87 \times m \times S)$$

$$m = \frac{162.6 \times q \times \mu \times \beta}{k \times h}$$

S = Skin (dim)

q = The injection rate of interest, barrels per day

μ = Viscosity, centipoise

β = Formation Volume Factor, reservoir barrel/stock tank barrel

k = Permeability, millidarcies
 h = Interval thickness, feet

Note that the “zero” reference point for the gauge should be considered in the depth adjustment (common to reference gauge zero to the well’s kelly bushing elevation). The reference depth for the Frio E and F Sand Injection Interval is 6,548 feet below ground level, the reference depth for the Frio A/B/C Sand Injection Interval is 6,820.5 feet below ground level.

6-4.5.4.2 Pressure Buildup Model Comparison to Static Bottomhole Pressure

The pseudo-static bottomhole pressure (affected by the injection/falloff and offset injection well) for the active injection intervals will be determined by adjusting the final measured reservoir pressure at the end of the falloff period (P_{static}) from gauge depth to sand reference depths of 6,548 feet below ground level for the Frio E and F Sand Injection Interval, 6,820.5 feet below ground level for the Frio A/B/C Sand Injection Interval. The depth adjusted static pressure will be calculated by correcting for elevation differences, using the following equation:

Depth-Adjusted Static Pressure ($P_{s(\text{adj})}$)

$$P_{s(\text{adj})} = P_{\text{meas}} + \left[(D_{\text{ref}} - D_{\text{gauge}}) \times DG_{\text{fluid}} \right]$$

$P_{s(\text{adj})}$ = Depth adjusted static pressure, psi
 P_{meas} = Measured pressure, psi (or Measured pressure, psia minus 14.7psi)
 D_{ref} = Reference depth, feet
 D_{gauge} = Gauge depth, feet
 DG_{fluid} = Density gradient of test fluid, psi/ft

Note that the “zero” reference point for the gauge should be considered in the depth adjustment (common to reference gauge zero to the well’s kelly bushing elevation).

For any dual-completion well, static pressures will be calculated at the reference depth for each injection interval. The depth-adjusted static pressures will be compared to the compliance pressures (Subsection 6-4.5.4) at a reference depth of 6,548 feet below ground level for the Frio E

and F Sand Injection Interval, 6,820.5 feet below ground level for the Frio A/B/C Sand Injection Interval.

APPENDIX A

EPA REGION 6 PRESSURE FALLOFF TESTING GUIDELINE

(THIRD REVISION – AUGUST 8, 2002)

EPA Region 6

**UIC PRESSURE FALLOFF
TESTING GUIDELINE**

Third Revision



August 8, 2002

TABLE OF CONTENTS

1.0	Background	1
2.0	Purpose of Guideline	1
3.0	Timing of Falloff Tests and Report Submission	2
4.0	Falloff Test Report Requirements	2
5.0	Planning	5
	General Operational Concerns	5
	Site Specific Pretest Planning	6
6.0	Conducting the Falloff Test	7
7.0	Evaluation of the Falloff Test	7
	1. Cartesian Plot	7
	2. Log-log Plot	7
	3. Semilog Plot	8
	4. Anomalous Results	8
8.0	Comparison of Falloff Test Results to No Migration Petition Data	8
9.0	Technical References	8

APPENDIX

APPENDIX

Initial Formation Reservoir Pressure from Falloff Testing	A-1
Pressure Gauge Usage and Selection	A-1
Usage	A-1
Selection	A-2
Test Design	A-2
General Operational Considerations	A-2
Wellbore and Reservoir Data Needed to Simulate or Analyze the Falloff Test	A-4
Design Calculations	A-4
Considerations for Offset Wells Completed in the Same Interval	A-5
Falloff Test Analysis	A-6
Cartesian Plot	A-6
Log-log Diagnostic Plot	A-7
Identification of Test Flow Regimes	A-7
Characteristics of Individual Test Flow Regimes	A-8
Wellbore Storage	A-8
Radial Flow	A-8
Spherical Flow	A-8
Linear Flow	A-9
Hydraulically Fractured Well	A-9
Naturally Fractured Rock	A-9
Layered Reservoir	A-9
Semilog Plot	A-9
Determination of the Appropriate Time Function for the Semilog Plot	A-10
Parameter Calculations and Considerations	A-11
Skin Factor	A-12
Radius of Investigation	A-13
Effective Wellbore Radius	A-13
Reservoir Injection Pressure Corrected for Skin Effects	A-13
Determination of the Appropriate Fluid Viscosity	A-14
Reservoir Thickness	A-15
Use of Computer Software	A-15
Common Sense Check	A-16

EPA Region 6

UIC PRESSURE FALLOFF TESTING GUIDELINE

Third Revision

August 8, 2002

1.0 Background

The Hazardous and Solid Waste Amendments of 1984 to the Resource Conservation and Recovery Act mandated prohibitions on the land disposal of hazardous waste. These prohibitions are known as the land disposal restrictions and EPA promulgated regulations to implement these requirements for injection wells on July 26, 1988. The land disposal restrictions for injection wells are codified in 40 CFR Part 148. In addition to specifying the effective dates of the restrictions on injection of specific hazardous wastes, these regulations outline the requirements for obtaining an exemption to the restrictions.

Facilities that have received an exemption to the land disposal restrictions under 40 CFR Part 148 have demonstrated that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. As part of this approval, facilities are required by Region 6 to meet approval conditions including annual monitoring in accordance with 40 CFR 148.20(d)(2).

Region 6 has adopted the 40 CFR 146.68(e)(1) requirements for monitoring Class 1 hazardous waste disposal wells. Under 40 CFR 146.68(e)(1), operators are required annually to monitor the pressure buildup in the injection zone, including at a minimum, a shut down of the well for a time sufficient to conduct a valid observation of the pressure falloff curve.

A falloff test is a pressure transient test that consists of shutting in an injection well and measuring the pressure falloff. The falloff period is a replay of the injection preceding it; consequently, it is impacted by the magnitude, length, and rate fluctuations of the injection period. Falloff testing analysis provides transmissibility, skin factor, and well flowing and static pressures. All of these parameters are critical for evaluation of technical adequacy of no migration demonstrations and UIC permits.

2.0 Purpose of Guideline

This guideline has been developed by the Region 6 office of the Environmental Protection Agency (EPA) to assist operators in planning and conducting the falloff test and preparing the annual monitoring report. Typically, this report should consist of a falloff test and a comparison of the reservoir parameters derived from the test with those of the petition demonstration. Falloff tests provide reservoir pressure data and characterize both the injection interval reservoir and the completion condition of the injection well. Both the reservoir parameters and pressure data are

necessary for no migration and UIC permit demonstrations. Additionally, a valid falloff test is a requirement of a no migration petition condition as well as a monitoring requirement under 40 CFR Part 146 for all Class I injection wells. For no migration purposes, the annual report is viewed not as an enforcement tool, but as an annual confirmation that the petition demonstration continues to be valid.

The main body of this guideline contains general information that pertains to the majority of the facilities impacted. Because each site is unique, one guideline cannot be written to encompass all situations. A more detailed discussion of many topics and equations is included in the attached Appendix.

The ultimate responsibility of conducting a valid falloff test is the task of the operator. Operators should QA/QC the pressure data and test results to confirm that the results “make sense” prior to submission of the report to the EPA for review.

3.0 Timing of Falloff Tests and Report Submission

Falloff tests must be conducted within one year from the date of the original petition approval and annually thereafter. The time interval for each test should not be less than 9 months or greater than 15 months from the previous test. This will ensure that the tests will be performed at relatively even intervals throughout the duration of the petition approval period. Operators can, at their discretion, plan these tests to coincide with the performance of their annual state MIT requirements as long as the time requirements are met. The falloff testing report should be submitted no later than 60 days following the test. Failure to submit a falloff test report will be considered a violation of the applicable petition condition and may result in an enforcement action. Any exceptions should be approved by EPA prior to conducting the test.

4.0 Falloff Test Report Requirements

In general, the report to EPA should provide general information and an overview of the falloff test, an analysis of the pressure data obtained during the test, a summary of the test results, and a comparison of the results with the parameters used in the no migration demonstration. Some of the following operator and well data will not change so once acquired, it can be copied and submitted with each annual report. The falloff test report should include the following information:

1. Company name and address
2. Test well name and location
3. The name and phone number of the facility contact person. The contractor contact may be included if approved by the facility in addition to a facility contact person.

4. A photocopy of an openhole log (SP or Gamma Ray) through the injection interval illustrating the type of formation and thickness of the injection interval. The entire log is not necessary.
5. Well schematic showing the current wellbore configuration and completion information:
 - C Wellbore radius
 - C Completed interval depths
 - C Type of completion (perforated, screen and gravel packed, openhole)
6. Depth of fill depth and date tagged.
7. Offset well information:
 - C Distance between the test well and offset well(s) completed in the same interval or involved in an interference test
 - C Simple illustration of locations of the injection and offset wells
8. Chronological listing of daily testing activities.
9. Electronic submission of the raw data (time, pressure, and temperature) from all pressure gauges utilized on a floppy disk or CD-ROM. A READ.ME file or the disk label should list all files included and any necessary explanations of the data. A separate file containing any edited data used in the analysis can be submitted as an additional file.
10. Tabular summary of the injection rate or rates preceding the falloff test. At a minimum, rate information for 48 hours prior to the falloff or for a time equal to twice the time of the falloff test is recommended. If the rates varied and the rate information is greater than 10 entries, the rate data should be submitted electronically as well as a hard copy of the rates for the report. Including a rate vs time plot is also a good way to illustrate the magnitude and number of rate changes prior to the falloff test.
11. Rate information from any offset wells completed in the same interval. At a minimum, the injection rate data for the 48 hours preceding the falloff test should be included in a tabular and electronic format. Adding a rate vs time plot is also helpful to illustrate the rate changes.
12. Hard copy of the time and pressure data analyzed in the report.
13. Pressure gauge information: (See Appendix, page A-1 for more information on pressure gauges)
 - C List all the gauges utilized to test the well
 - C Depth of each gauge
 - C Manufacturer and type of gauge. Include the full range of the gauge.
 - C Resolution and accuracy of the gauge as a % of full range.
 - C Calibration certificate and manufacturer's recommended frequency of calibration
14. General test information:
 - C Date of the test
 - C Time synchronization: A specific time and date should be synchronized to an equivalent time in each pressure file submitted. Time synchronization should also be provided for the rate(s) of the test well and any offset wells.
 - C Location of the shut-in valve (e.g., note if at the wellhead or number of feet from the wellhead)

15. Reservoir parameters (determination):
- C Formation fluid viscosity, μ_f cp (direct measurement or correlation)
 - C Porosity, N fraction (well log correlation or core data)
 - C Total compressibility, c_t psi $^{-1}$ (correlations, core measurement, or well test)
 - C Formation volume factor, rvb/stb (correlations, usually assumed 1 for water)
 - C Initial formation reservoir pressure - See Appendix, page A-1
 - C Date reservoir pressure was last stabilized (injection history)
 - C Justified interval thickness, h ft - See Appendix, page A-15
16. Waste plume:
- C Cumulative injection volume into the completed interval
 - C Calculated radial distance to the waste front, r_{waste} ft
 - C Average historical waste fluid viscosity, if used in the analysis, μ_{waste} cp
17. Injection period:
- C Time of injection period
 - C Type of test fluid
 - C Type of pump used for the test (e.g., plant or pump truck)
 - C Type of rate meter used
 - C Final injection pressure and temperature
18. Falloff period:
- C Total shut-in time, expressed in real time and Δt , elapsed time
 - C Final shut-in pressure and temperature
 - C Time well went on vacuum, if applicable
19. Pressure gradient:
- C Gradient stops - for depth correction
20. Calculated test data: include all equations used and the parameter values assigned for each variable within the report
- C Radius of investigation, r_i ft
 - C Slope or slopes from the semilog plot
 - C Transmissibility, kh : md-ft/cp
 - C Permeability (range based on values of h)
 - C Calculation of skin, s
 - C Calculation of skin pressure drop, ΔP_{skin}
 - C Discussion and justification of any reservoir or outer boundary models used to simulate the test
 - C Explanation for any pressure or temperature anomaly if observed
21. Graphs:
- C Cartesian plot: pressure and temperature vs. time
 - C Log-log diagnostic plot: pressure and semilog derivative curves. Radial flow regime should be identified on the plot
 - C Semilog and expanded semilog plots: radial flow regime indicated and the semilog straight line drawn
 - C Injection rate(s) vs time: test well and offset wells (not a circular or strip chart)
22. A comparison of all parameters with those used in the petition demonstration, including references where the parameters can be found in the petition.

23. A copy of the latest radioactive tracer run to fulfill the annual mechanical integrity testing requirement for the State and a brief discussion of the results.
24. Compliance with any unusual petition approval conditions such as the submission of an annual flow profile survey. These additional conditions may be addressed either in the annual falloff testing report or in an accompanying document.

5.0 Planning

The radial flow portion of the test is the basis for all pressure transient calculations. Therefore the injectivity and falloff portions of the test should be designed not only to reach radial flow, but to sustain a time frame sufficient for analysis of the radial flow period.

General Operational Concerns

Successful well testing involves the consideration of many factors, most of which are within the operator's control. Some considerations in the planning of a test include:

- C Adequate storage for the waste should be ensured for the duration of the test
- C Offset wells completed in the same formation as the test well should be shut-in, or at a minimum, provisions should be made to maintain a constant injection rate prior to and during the test
- C Install a crown valve on the well prior to starting the test so the well does not have to be shut-in to install a pressure gauge
- C The location of the shut-in valve on the well should be at or near the wellhead to minimize the wellbore storage period
- C The condition of the well, junk in the hole, wellbore fill or the degree of wellbore damage (as measured by skin) may impact the length of time the well must be shut-in for a valid falloff test. This is especially critical for wells completed in relatively low transmissibility reservoirs or wells that have large skin factors.
- C Cleaning out the well and acidizing may reduce the wellbore storage period and therefore the shut-in time of the well
- C Accurate recordkeeping of injection rates is critical including a mechanism to synchronize times reported for injection rate and pressure data. The elapsed time format usually reported for pressure data does not allow an easy synchronization with real time rate information. Time synchronization of the data is especially critical when the analysis includes the consideration of injection from more than one well.
- C Any unorthodox testing procedure, or any testing of a well with known or anticipated problems, should be discussed with EPA staff prior to performing the test.
- C Other pressure transient tests may be used in conjunction or in place of a falloff test in some situations. For example, if surface pressure measurements must be used because of a corrosive wastestream and the well will go on vacuum following shut-in, a multi-rate test may be used so that a positive surface pressure is maintained at the well.

- C If more than one well is completed into the same reservoir, operators are encouraged to send at least two pulses to the test well by way of rate changes in the offset well following the falloff test. These pulses will demonstrate communication between the wells and, if maintained for sufficient duration, they can be analyzed as an interference test to obtain interwell reservoir parameters.

Site Specific Pretest Planning

1. Determine the time needed to reach radial flow during the injectivity and falloff portions of the test:
 - C Review previous welltests, if available
 - C Simulate the test using measured or estimated reservoir and well completion parameters
 - C Calculate the time to the beginning of radial flow using the empirically-based equations provided in the Appendix. The equations are different for the injectivity and falloff portions of the test with the skin factor influencing the falloff more than the injection period. (See Appendix, page A-4 for equations)
 - C Allow adequate time beyond the beginning of radial flow to observe radial flow so that a well developed semilog straight line occurs. A good rule of thumb is 3 to 5 times the time to reach radial flow to provide adequate radial flow data for analysis.
2. Adequate and consistent injection fluid should be available so that the injection rate into the test well can be held constant prior to the falloff. This rate should be high enough to produce a measurable falloff at the test well given the resolution of the pressure gauge selected. The viscosity of the fluid should be consistent. Any mobility issues (k/f) should be identified and addressed in the analysis if necessary.
3. Bottomhole pressure measurements are usually superior to surface pressure measurements because bottomhole measurements tend to be less noisy. Surface pressure measurements can be used if positive pressure is maintained at the surface throughout the falloff portion of the test. The surface pressure gauge should be located at the wellhead. A surface pressure gauge may also serve as a backup to a downhole gauge and provide a monitoring tool for tracking the test progress. Surface gauge data can be plotted during the falloff in a log-log plot format with the pressure derivative function to determine if the test has reached radial flow and can be terminated. Note: Surface pressure measurements are not adequate if the well goes on a vacuum during the test. (See Appendix, page A-2 for additional information concerning pressure gauge selection.)
4. Use two pressure gauges during the test with one gauge serving as a backup, or for verification in cases of questionable data quality. The two gauges do not need to be the same type. (See Appendix, page A-1 for additional information concerning pressure gauges.)

6.0 Conducting the Falloff Test

1. Tag and record the depth to any fill in the test well
2. Simplify the pressure transients in the reservoir
 - C Maintain a constant injection rate in the test well prior to shut-in. This injection rate should be high enough and maintained for a sufficient duration to produce a measurable pressure transient that will result in a valid falloff test.
 - C Offset wells should be shut-in prior to and during the test. If shut-in is not feasible, a constant injection rate should be recorded and maintained during the test and then accounted for in the analysis.
 - C Do not shut-in two wells simultaneously or change the rate in an offset well during the test.
3. The test well should be shut-in at the wellhead in order to minimize wellbore storage and afterflow. (See Appendix, page A-3 for additional information.)
4. Maintain accurate rate records for the test well and any offset wells completed in the same injection interval.
5. Measure and record the viscosity of the injectate periodically during the injectivity portion of the test to confirm the consistency of the test fluid.

7.0 Evaluation of the Falloff Test

1. Prepare a Cartesian plot of the pressure and temperature versus real time or elapsed time.
 - C Confirm pressure stabilization prior to shut-in of the test well
 - C Look for anomalous data, pressure drop at the end of the test, determine if pressure drop is within the gauge resolution
2. Prepare a log-log diagnostic plot of the pressure and semilog derivative. Identify the flow regimes present in the welltest. (See Appendix, page A-6 for additional information.)
 - C Use the appropriate time function depending on the length of the injection period and variation in the injection rate preceding the falloff (See Appendix, page A-10 for details on time functions.)
 - C Mark the various flow regimes - particularly the radial flow period
 - C Include the derivative of other plots, if appropriate (e.g., square root of time for linear flow)
 - C If there is no radial flow period, attempt to type curve match the data

3. Prepare a semilog plot.
 - C Use the appropriate time function depending on the length of injection period and injection rate preceding the falloff
 - C Draw the semilog straight line through the radial flow portion of the plot and obtain the slope of the line
 - C Calculate the transmissibility, $kh/:$
 - C Calculate the skin factor, s , and skin pressure drop, ΔP_{skin}
 - C Calculate the radius of investigation, r_i

4. Explain any anomalous results.

8.0 Comparison of Falloff Results to No Migration Petition Data

A comparison between the falloff test results and the parameters used in the no migration petition demonstration should be made. Specifically, the following should be demonstrated:

- C Both the flowing and static bottom hole pressures measured during the test should be corrected for skin and be at or below those which were predicted to occur by the pressure buildup model in the provided no migration petition for the same point in time. (See Appendix, page A-13)

- C It should be shown that the ($kh/:$) parameter group calculated from the current falloff data is the same or greater than that employed in the pressure buildup modeling.

9.0 Technical References

1. SPE Textbook Series No. 1, "Well Testing," 1982, W. John Lee
2. SPE Monograph 5, "Advances in Well Test Analysis," 1977, Robert Earlougher, Jr.
3. SPE Monograph 1, "Pressure Buildup and Flow Tests in Wells," 1967, C.S. Matthews and D.G. Russell
4. "Well Test Interpretation In Bounded Reservoirs," Hart's Petroleum Engineer International, Spivey, and Lee, November 1997
5. "Derivative of Pressure: Application to Bounded Reservoir Interpretation," SPE Paper 15861, Proano, Lilley, 1986
6. "Well Test Analysis," Sabet, 1991
7. "Pressure Transient Analysis," Stanislav and Kabir, 1990
8. "Well Testing: Interpretation Methods," Bourdarot, 1996
9. "A New Method To Account For Producing Time Effects When Drawdown Type Curves Are Used To Analyze Pressure Buildup And Other Test Data," SPE Paper 9289, Agarwal, 1980

10. "Modern Well Test Analysis – A Computer-Aided Approach," Roland N. Horne, 1990
11. Exxon Monograph, "Well Testing in Heterogeneous Formations," Tatiana Streltsova, 1987
12. EPA Region 6 Falloff Guidelines
13. "Practical Pressure Gauge Specification Considerations In Practical Well Testing," SPE Paper No. 22752, Veneruso, Ehlig-Economides, and Petitjean, 1991
14. "Guidelines Simplify Well Test Interpretation," Oil and Gas Journal, Ehlig-Economides, Hegeman, and Vik, July 18, 1994
15. Oryx Energy Company, Practical Pressure Transient Testing, G. Lichtenberger and K. Johnson, April 1990 (Internal document)
16. Pressure-Transient Test Design in Tight Gas Formations, SPE Paper 17088, W.J. Lee, October 1987
17. "Radius-of-Drainage and Stabilization-Time Equations," Oil and Gas Journal, H.K. Van Poolen, Sept 14, 1964
18. "Effects of Permeability Anisotropy and Layering On Well Test Interpretation," Hart's Petroleum Engineer International, Spivey, Aly, and Lee, February 1998
19. "Three Key Elements Necessary for Successful Testing," Oil and Gas Journal, Ehlig-Economides, Hegeman, Clark, July 25, 1994
20. "Introduction to Applied Well Test Interpretation," Hart's Petroleum Engineer International, Spivey, and Lee, August 1997
21. "Recent Developments In Well Test Analysis," Hart's Petroleum Engineer International, Stewart, August 1997
22. "Fundamentals of Type Curve Analysis," Hart's Petroleum Engineer International, Spivey, and Lee, September 1997
23. "Identifying Flow Regimes In Pressure Transient Tests," Hart's Petroleum Engineer International, Spivey and Lee, October 1997
24. "Selecting a Reservoir Model For Well Test Interpretation," Hart's Petroleum Engineer International, Spivey, Ayers, Pursell, and Lee, December 1997
27. "Use of Pressure Derivative in Well-Test Interpretation," SPE Paper 12777, SPE Formation Evaluation Journal, Bourdet, Ayoub, and Pirard, June 1989
28. "A New Set of Type Curves Simplifies Well Test Analysis," World Oil, Bourdet, Whittle, Douglas, and Pirard, May 1983

APPENDIX

Initial Formation Reservoir Pressure from Falloff Testing

For use in the no migration demonstration pressure buildup modeling:

- ☐ Some predictive models calculate a pressure buildup while other models calculate a specific pressure based on an initial reservoir pressure assigned to the model. No wellbore skin should be assumed in the demonstration. Historical falloff flowing pressure data used for comparison with model results should be corrected for skin effects
- ☐ The initial pressure should represent the initial reservoir pressure prior to initiation of injection in the model.
- ☐ Direct bottomhole static measurements are best. If no measurements are available, or are questionable, attempt to correct static surface pressures to bottomhole conditions. Use site specific information if available. Alternatively, the facility can reference a technical paper that may discuss the initial pressure of the injection interval at another location in the same area or an initial static pressure measurement from an offset injection well.
- ☐ Review historical measured static pressures. The initial reservoir pressure should be lower than the measured static pressures following injection at the well.

For use in Cone of Influence (COI) calculations in both no migration demonstrations and UIC permits:

- ☐ P^* is the false extrapolated pressure obtained from the semilog straight line at a time of 1 hour and is often used as the average reservoir pressure
- ☐ P^* is only applicable for a new well in an infinite acting reservoir
- ☐ EPA Region 6 does not recommend using P^* for the average reservoir pressure. For long injection periods, P^* will differ significantly from \bar{P} , the average reservoir pressure
- ☐ Use the final shut-in pressure, if the well reaches radial flow, for the cone of influence calculation

Pressure Gauge Usage and Selection

Usage

- ☐ EPA recommends that two gauges be used during the test with one gauge serving as a backup.
- ☐ As a general rule, downhole pressure measurements are less noisy and are preferred. Surface pressure measurements can be employed if positive pressure is maintained at the surface throughout the test. Surface gauges are insufficient if the well goes on a vacuum.
- ☐ Surface pressure gauges may be impacted by the fluctuations in ambient temperature that can occur over the course of a normal day. If unchecked, this aspect of these gauges can result in erroneous pressure readings. Insulating the gauges appears to be an effective countermeasure for temperature fluctuations in many instances.

- C A surface or bottomhole surface readout gauge (SRO) allows tracking of pressures in real time. Analysis of this data can be performed in the field to confirm that the well has reached radial flow prior to ending the test.
- C The derivative function plotted on the log-log plot amplifies noise in the data, so the use of a good pressure recording device is critical for application of this curve.
- C Mechanical gauges should be calibrated before and after each test using a dead weight tester.
- C Electronic gauges should also be calibrated according to the manufacturer's recommendations. The manufacturer's recommended frequency of calibration, and a copy of the gauge calibration certificate should be provided with the falloff testing report demonstrating this practice has been followed.

Selection

- C The pressures must remain within the range of the pressure gauge. The larger percent of the gauge range utilized in the test, the better. Typical pressure gauge limits are 2000, 5000, and 10000 psi. Note that gauge accuracy and resolution are typically a function of percent of the full gauge range.
- C Electronic downhole gauges generally offer much better resolution and sensitivity than a mechanical gauge but cost more. Additionally, the electronic gauge can generally run for a longer period of time, be programmed to measure pressure more frequently at various intervals for improved data density, and store data in digital form.
- C Resolution of the pressure gauge must be sufficient to measure small pressure changes at the end of the test.
- C The type of wastestream injected may prevent the use of a downhole gauge unless brine from offsite is brought in and used for the test. This may be cost prohibitive.

Test Design

General Operational Considerations

- C The injection period controls what is seen on the falloff since the falloff is replay of the injection period. Therefore, the injection period must reach radial flow prior to shut-in of the well in order for the falloff test to reach radial flow
- C Ideally to determine the optimal lengths of the injection and falloff periods, the test should be simulated using measured or estimated reservoir parameters. Alternatively, injection and falloff period lengths can be estimated from empirical equations using assumed reservoir and well parameters.
- C The injection rate dictates the pressure buildup at the injection well. The pressure buildup from injection must be sufficient so that the pressure change during radial flow, usually occurring toward the end of the test, is large enough to measure with the pressure gauge selected.

- C Waste storage and other operational issues require preplanning and need to be addressed prior to the test date. If brine must be brought in for the injection portion of the test, operators should insure that the fluid injected has a consistent viscosity and that there is adequate fluid available to obtain a valid falloff test. The use of the wastestream as the injection fluid affords several distinct advantages:
 1. Brine does not have to be purchased or stored prior to use.
 2. Onsite waste storage tanks may be used.
 3. Plant wastestreams are generally consistent, i.e., no viscosity variations
- C Rate changes cause pressure transients in the reservoir. Constant rate injection in the test well and any offset wells completed in the same reservoir are critical to simplify the pressure transients in the reservoir. Any significant injection rate fluctuations at the test well or offsets must be recorded and accounted for in the analysis using superposition.
- C Unless an injectivity test is to be conducted, shutting in the well for an extend period of time prior to conducting the falloff test reduces the pressure buildup in the reservoir and is not recommended.
- C Prior to conducting a test, a crown valve should be installed on the wellhead to allow the pressure gauge to be installed and lowered into the well without any interruption of the injection rate.
- C The wellbore schematic should be reviewed for possible obstructions located in the well that may prevent the use or affect the setting depth of a downhole pressure gauge. The fill depth in the well should also be reported. The fill depth may not only impact the depth of the gauge, but usually prolongs the wellbore storage period and depending on the type of fill, may limit the interval thickness by isolating some of the injection intervals. A wellbore cleanout or stimulation may be needed prior to conducting the test for the test to reach radial flow and obtain valid results.
- C The location of the shut-in valve can impact the duration of the wellbore storage period. The shut-in valve should be located near the wellhead. Afterflow into the wellbore prolongs the wellbore storage period. The injection pipeline leading to the well can act as an extension to the well if the shut-in valve is not located near the wellhead. Operators should report the location of the shut-in valve and its distance from the wellhead, in the test report.
- C The area geology should be reviewed prior to conducting the test to determine the thickness and type of formation being tested along with any geological features such as natural fractures, a fault, or a pinchout that should be anticipated to impact the test.

Wellbore and Reservoir Data Needed to Simulate or Analyze the Falloff Test

- C Wellbore radius, r_w - from wellbore schematic
- C Net thickness, h - See Appendix, page A-15
- C Porosity, N - log or core data
- C Viscosity of formation fluid, μ_f - direct measurement or correlations
- C Viscosity of waste, μ_{waste} - direct measurement or correlations
- C Total system compressibility, c_t - correlations, core measurement, or well test
- C Permeability, k - previous welltests or core data
- C Specific gravity of injection fluid, $s.g.$ - direct measurement
- C Injection rate, q - direct measurement

Design Calculations

When simulation software is unavailable the test periods can be estimated from empirical equations. The following are set of steps to calculate the time to reach radial flow from empirically-derived equations:

1. Estimate the wellbore storage coefficient, C (bbl/psi). There are two equations to calculate the wellbore storage coefficient depending on if the well remains fluid filled (positive surface pressure) or if the well goes on a vacuum (falling fluid level in the well):

- a. Well remains fluid filled:

$$C = V_w \cdot c_{waste} \quad \text{where, } V_w \text{ is the total wellbore volume, bbls}$$
$$c_{waste} \text{ is the compressibility of the injectate, psi}^{-1}$$

- b. Well goes on a vacuum:

$$C = \frac{V_u}{\frac{r \cdot g}{144 \cdot g_c}} \quad \text{where, } V_u \text{ is the wellbore volume per unit length, bbls/ft}$$

D is the injectate density, psi/ft
 g and g_c are gravitational constants

2. Calculate the time to reach radial flow for both the injection and falloff periods. Two different empirically-derived equations are used to calculate the time to reach radial flow, $t_{radial\ flow}$, for the injectivity and falloff periods:

- a. Injectivity period:

$$t_{radial\ flow} > \frac{(200000 + 12000s) \cdot C}{k \cdot h} \frac{\text{hours}}{m}$$

- b. Falloff period:

$$t_{radial\ flow} > \frac{170000 \cdot C \cdot e^{0.14s}}{k \cdot h} \frac{\text{hours}}{m}$$

The wellbore storage coefficient is assumed to be the same for both the injectivity and falloff periods. The skin factor, s , influences the falloff more than the injection period.

Use these equations with caution, as they tend to fall apart for a well with a large permeability or a high skin factor. Also remember, the welltest should not only reach radial flow, but also sustain radial flow for a timeframe sufficient for analysis of the radial flow period. As a rule of thumb, a timeframe sufficient for analysis is 3 to 5 times the time needed to reach radial flow.

3. As an alternative to steps 1 and 2, to look a specific distance “L” into the reservoir and possibly confirm the absence or existence of a boundary, the following equation can be used to estimate the time to reach that distance:

$$t_{\text{boundary}} = \frac{948 \cdot f \cdot m \cdot c_t \cdot L_{\text{boundary}}}{k} \text{ hours}$$

where, L_{boundary} = feet to boundary

t_{boundary} = time to boundary, hrs

Again, this is the time to reach a distance “L” in the reservoir. Additional test time is required to observe a fully developed boundary past the time needed to just reach the boundary. As a rule of thumb, to see a fully developed boundary on a log-log plot, allow at least 5 times the time to reach it. Additionally, for a boundary to show up on the falloff, it must first be encountered during the injection period.

4. Calculate the expected slope of the semilog plot during radial flow to see if gauge resolution will be adequate using the following equation:

$$m_{\text{semilog}} = \frac{162.6 \cdot q \cdot B}{k \cdot h}$$

m

where, q = the injection rate preceding the falloff test, bpd

B = formation volume factor for water, rvb/stb (usually assumed to be 1)

Considerations for Offset Wells Completed in the Same Interval

Rate fluctuations in offset wells create additional pressure transients in the reservoir and complicate the analysis. Always try to simplify the pressure transients in the reservoir. Do not simultaneously shut-in an offset well and the test well. The following items are key considerations in dealing with the impact of offset wells on a falloff test:

- ☐ Shut-in all offset wells prior to the test
- ☐ If shutting in offset wells is not feasible, maintain a constant injection rate prior to and during the test
- ☐ Obtain accurate injection records of offset injection prior to and during the test
- ☐ At least one of the real time points corresponding to an injection rate in an offset well should be synchronized to a specific time relating to the test well

- C Following the falloff test in the test well, send at least two pulses from the offset well to the test well by fluctuating the rate in the offset well. The pressure pulses can confirm communication between the wells and can be simulated in the analysis if observed at the test well. The pulses can also be analyzed as an interference test using an Ei type curve.
- C If time permits, conduct an interference test to allow evaluation of the reservoir without the wellbore effects observed during a falloff test.

Falloff Test Analysis

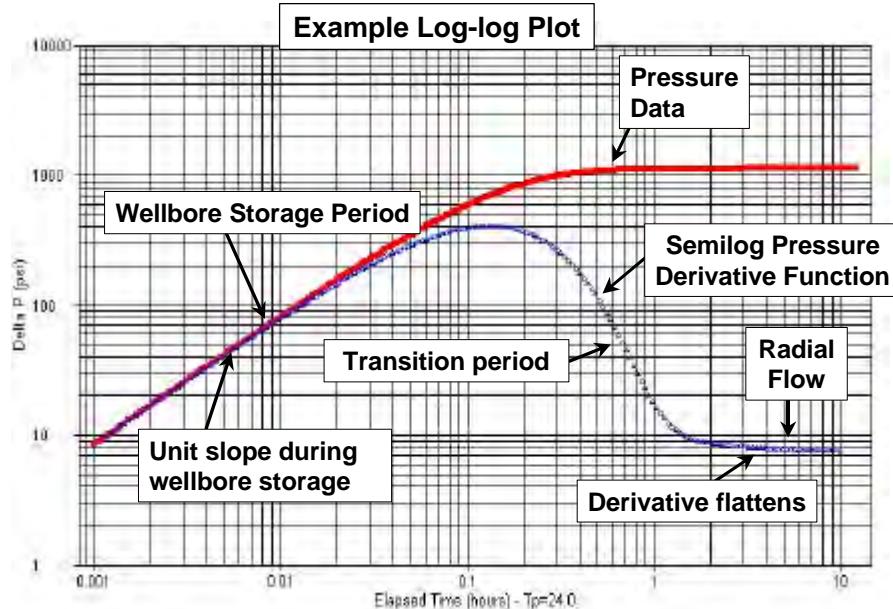
In performing a falloff test analysis, a series of plots and calculations should be prepared to QA/QC the test, identify flow regimes, and determine well completion and reservoir parameters. Individual plots, flow regime signatures, and calculations are discussed in the following sections.

Cartesian Plot

- C The pressure data prior to shut-in of the well should be reviewed on a Cartesian plot to confirm pressure stabilization prior to the test. A well that has reached radial flow during the injectivity portion of the test should have a consistent injection pressure.
- C A Cartesian plot of the pressure and temperature versus real time or elapsed time should be the first plot made from the falloff test data. Late time pressure data should be expanded to determine the pressure drop occurring during this portion of the test. The pressure changes should be compared to the pressure gauges used to confirm adequate gauge resolution existed throughout the test. If the gauge resolution limit was reached, this timeframe should be identified to determine if radial flow was reached prior to reaching the resolution of the pressure gauge. Pressure data obtained after reaching the resolution of the gauge should be treated as suspect and may need to be discounted in the analysis.
- C Falloff tests conducted in highly transmissive reservoirs may be more sensitive to the temperature compensation mechanism of the gauge because the pressure buildup response evaluated is smaller. Region 6 has observed cases in which large temperature anomalies were not properly compensated for by the pressure gauge, resulting in erroneous pressure data and an incorrect analysis. For this reason, the Cartesian plot of the temperature data should be reviewed. Any temperature anomalies should be noted to determine if they correspond to pressure anomalies.
- C Include the injection rate(s) of the test well 48 hours prior to shut-in on the Cartesian plot to illustrate the consistency of the injection rate prior to shut-in and to determine the appropriate time function to use on the log-log and semilog plots. (See Appendix, page A10 for time function selection)

Log-log Diagnostic Plot

- C Plot the pressure and semilog derivative versus time on a log-log diagnostic plot. Use the appropriate time function based on the rate history of the injection period preceding the falloff. (See Appendix, page A-10 for time function selection) The log-log plot is used to identify the flow regimes present in the welltest. An example log-log plot is shown below:



Identification of Test Flow Regimes

- C Flow regimes are mathematical relationships between pressure, rate, and time. Flow regimes provide a visualization of what goes on in the reservoir. Individual flow regimes have characteristic slopes and a sequencing order on the log-log plot.
- C Various flow regimes will be present during the falloff test, however, not all flow regimes are observed on every falloff test. The late time responses correlate to distances further from the test well. The critical flow regime is radial flow from which all analysis calculations are performed. During radial flow, the pressure responses recorded are representative of the reservoir, not the wellbore.
- C The derivative function amplifies reservoir signatures by calculating a running slope of a designated plot. The derivative plot allows a more accurate determination of the radial flow portion of the test, in comparison with the old method of simply proceeding 1½ log cycles from the end of the unit slope line of the pressure curve.
- C The derivative is usually based on the semilog plot, but it can also be calculated based on other plots such as a Cartesian plot, a square root of time plot, a quarter root of time plot, and the 1/square root of time plot. Each of these plots are used to identify specific flow

regimes. If the flow regime characterized by a specialized plot is present then when the derivative calculated from that plot is displayed on the log-log plot, it will appear as a “flat spot” during the portion of the falloff corresponding to the flow regime.

- C Typical flow regimes observed on the log-log plot and their semilog derivative patterns are listed below:

<u>Flow Regime</u>	<u>Semilog Derivative Pattern</u>
Wellbore Storage	Unit slope
Radial Flow	Flat plateau
Linear Flow	Half slope
Bilinear Flow	Quarter slope
Partial Penetration	Negative half slope
Layering	Derivative trough
Dual Porosity	Derivative trough
Boundaries	Upswing followed by plateau
Constant Pressure	Sharp derivative plunge

Characteristics of Individual Test Flow Regimes

- C Wellbore Storage:
1. Occurs during the early portion of the test and is caused by the well being shut-in at the surface instead of the sandface
 2. Measured pressure responses are governed by well conditions and are not representative of reservoir behavior and are characterized by both the pressure and semilog derivative curves overlying a unit slope on the log-log plot
 3. Wellbore skin or a low permeability reservoir results in a slower transfer of fluid from the well to the formation, extending the duration of the wellbore storage period
 4. A wellbore storage dominated test is unanalyzable
- C Radial Flow:
1. The pressure responses are from the reservoir, not the wellbore
 2. The critical flow regime from which key reservoir parameters and completion conditions calculations are performed
 3. Characterized by a flattening of the semilog plot derivative curve on the log-log plot and a straight line on the semilog plot
- C Spherical Flow:
1. Identifies partial penetration of the injection interval at the wellbore
 2. Characterized by the semilog derivative trending along a negative half slope on the log-log plot and a straight line on the 1/square root of time plot
 3. The log-log plot derivative of the pressure vs 1/square root of time plot is flat

- C Linear Flow
 - 1. May result from flow in a channel, parallel faults, or a highly conductive fracture
 - 2. Characterized by a half slope on both the log-log plot pressure and semilog derivative curves with the derivative curve approximately 1/3 of a log cycle lower than the pressure curve and a straight line on the square root of time plot.
 - 3. The log-log plot derivative of the pressure vs square root of time plot is flat
- C Hydraulically Fractured Well
 - 1. Multiple flow regimes present including wellbore storage, fracture linear flow, bilinear flow, pseudo-linear flow, formation linear flow, and pseudo-radial flow
 - 2. Fracture linear flow is usually hidden by wellbore storage
 - 3. Bilinear flow results from simultaneous linear flows in the fracture and from the formation into the fracture, occurs in low conductivity fractures, and is characterized by a quarter slope on both the pressure and semilog derivative curves on the log-log plot and by a straight line on a pressure versus quarter root of time plot
 - 4. Formation linear flow is identified by a half slope on both the pressure and semilog derivative curves on the log-log plot and by a straight line on a pressure versus square root of time plot
 - 5. Psuedo-radial flow is analogous to radial flow in an unfractured well and is characterized by flattening of semilog derivative curve on the log-log plot and a straight line on a semilog pressure plot
- C Naturally Fractured Rock
 - 1. The fracture system will be observed first on the falloff test followed by the total system consisting of the fractures and matrix.
 - 2. The falloff analysis is complex. The characteristics of the semilog derivative trough on the log-log plot indicate the level of communication between the fractures and the matrix rock.
- C Layered Reservoir
 - 1. Analysis of a layered system is complex because of the different flow regimes, skin factors or boundaries that may be present in each layer.
 - 2. The falloff test objective is to get a total transmissibility from the whole reservoir system.
 - 3. Typically described as commingled (2 intervals with vertical separation) or crossflow (2 intervals with hydraulic vertical communication)

Semilog Plot

- C The semilog plot is a plot of the pressure versus the log of time. There are typically four different semilog plots used in pressure transient and falloff testing analysis. After plotting the appropriate semilog plot, a straight line should be drawn through the points located within the equivalent radial flow portion of the plot identified from the log-log plot.

- C Each plot uses a different time function depending on the length and variation of the injection rate preceding the falloff. These plots can give different results for the same test, so it is important that the appropriate plot with the correct time function is used for the analysis. Determination of the appropriate time function is discussed below.
- C The slope of the semilog straight line is then used to calculate the reservoir transmissibility - $kh/$, the completion condition of the well via the skin factor - s , and also the radius of investigation - r_i of the test.

Determination of the Appropriate Time Function for the Semilog Plot

The following four different semilog plots are used in pressure transient analysis:

1. Miller Dyes Hutchinson (MDH) Plot
2. Horner Plot
3. Agarwal Equivalent Time Plot
4. Superposition Time Plot

These plots can give different results for the same test. Use of the appropriate plot with the correct time function is critical for the analysis.

- C The MDH plot is a semilog plot of pressure versus $\log(t)$, where t is the elapsed shut-in time of the falloff.
 1. The MDH plot only applies to wells that reach psuedo-steady state during injection. Psuedo-steady state means the pressure response from the well has encountered all the boundaries around the well.
 2. The MDH plot is only applicable to injection wells with a *very* long injection period at a constant rate. This plot is not recommended for use by EPA Region 6.
- C The Horner plot is a semilog plot of pressure versus $\log(t_p + t)/t$. The Horner plot is only used for a falloff preceded by a single constant rate injection period.
 1. The injection time, $t_p = V_p/q$ in hours, where V_p =injection volume since the last pressure equalization and q is the injection rate prior to shut-in for the falloff test. The injection volume is often taken as the cumulative injection since completion.
 2. The Horner plot can result in significant analysis error if the injection rate varies prior to the falloff.
- C The Agarwal equivalent time plot is a semilog plot of the pressure versus Agarwal equivalent time, $\log(t_e)$.
 1. The Agarwal equivalent time function is similar to the Horner plot, but scales the falloff to make it look like an injectivity test.
 2. It is used when the injection period is a short, constant rate compared to the length of the falloff period.
 3. The Agarwal equivalent time is defined as: $t_e = \log(t_p + t)/t$, where t_p is calculated the same as with the Horner plot.

- C The superposition time function accounts for variable rate conditions preceding the falloff.
1. It is the most rigorous of all the time functions and is usually calculated using welltest software.
 2. The use of the superposition time function requires the operator to accurately track the rate history. As a rule of thumb, at a minimum, the rate history for twice the length of the falloff test should be included in the analysis.

The determination of which time function is appropriate for the plotting the welltest on semilog and log-log plots depends on available rate information, injection period length, and software:

1. If there is not a rate history other than a single rate and cumulative injection, use a Horner time function
2. If the injection period is shorter than the falloff test and only a single rate is available, use the Agarwal equivalent time function
3. If you have a variable rate history use superposition when possible. As an alternative to superposition, use Agarwal equivalent time on the log-log plot to identify radial flow. The semilog plot can be plotted in either Horner or Agarwal time if radial flow is observed on the log-log plot.

Parameter Calculations and Considerations

- C Transmissibility - The slope of the semilog straight line, m, is used to determine the transmissibility (kh/μ) parameter group from the following equation:

$$\frac{k \cdot h}{\mu} = \frac{162.6 \cdot q \cdot B}{m}$$

where,

q = injection rate, bpd (negative for injection)

B = formation volume factor, rvb/stb (Assumed to be 1 for formation fluid)

m = slope of the semilog straight line through the radial flow portion of the plot in psi/log cycle

k = permeability, md

h = thickness, ft (See Appendix, page A-15)

μ = viscosity, cp

- C The viscosity, μ , is usually that of the formation fluid. However, if the waste plume size is massive, the radial flow portion of the test may remain within the waste plume. (See Appendix, page A-14)
1. The waste and formation fluid viscosity values usually are similar, however, if the wastestream has a significant viscosity difference, the size of the waste plume and distance to the radial flow period should be calculated.
 2. The mobility, k/μ , differences between the fluids may be observed on the derivative curve.
- C The permeability, k, can be obtained from the calculated transmissibility (kh/μ) by

substituting the appropriate thickness, h , and viscosity, μ , values.

Skin Factor

- C In theory, wellbore skin is treated as an infinitesimally thin sheath surrounding the wellbore, through which a pressure drop occurs due to either damage or stimulation. Industrial injection wells deal with a variety of waste streams that alter the near wellbore environment due to precipitation, fines migration, ion exchange, bacteriological processes, and other mechanisms. It is reasonable to expect that this alteration often exists as a zone surrounding the wellbore and not a skin. Therefore, at least in the case of industrial injection wells, the assumption that skin exists as a thin sheath is not always valid. This does not pose a serious problem to the correct interpretation of falloff testing except in the case of a large zone of alteration, or in the calculation of the flowing bottomhole pressure. The Region has seen instances in which large zones of alteration were suspected of being present.
- C The skin factor is the measurement of the completion condition of the well. The skin factor is quantified by a positive value indicating a damaged completion and a negative value indicating a stimulated completion.
1. The magnitude of the positive value indicating a damaged completion is dictated by the transmissibility of the formation.
 2. A negative value of -4 to -6 generally indicates a hydraulically fractured completion, whereas a negative value of -1 to -3 is typical of an acid stimulation in a sandstone reservoir.
 3. The skin factor can be used to calculate the effective wellbore radius, r_{wa} also referred to as the apparent wellbore radius. (See Appendix, page A-13)
 4. The skin factor can also be used to correct the injection pressure for the effects of wellbore damage to get the actual reservoir pressure from the measured pressure.

- C The skin factor is calculated from the following equation:

$$s = 1.1513 \left[\frac{P_{1hr} - P_{wf}}{m} - \log \left(\frac{k \cdot t_p}{(t_p + 1) \cdot F \cdot m \cdot c_t \cdot r_w^2} \right) + 3.23 \right]$$

where, s = skin factor, dimensionless

P_{1hr} = pressure intercept along the semilog straight line at a shut-in time of 1 hour, psi

P_{wf} = measured injection pressure prior to shut-in, psi

m = slope of the semilog straight line, psi/cycle

k = permeability, md

N = porosity, fraction

c_t = total compressibility, psi^{-1}

r_w = wellbore radius, feet

t_p = injection time, hours

Note that the term $t_p/(t_p + \tau)$, where $\tau = 1$ hr, appears in the log term. This term is usually assumed to result in a negligible contribution and typically is taken as 1 for large t . However, for relatively short injection periods, as in the case of a drill stem test (DST), this term can be significant.

Radius of Investigation

- C The radius of investigation, r_i , is the distance the pressure transient has moved into a formation following a rate change in a well.
- C There are several equations that exist to calculate the radius of investigation. All the equations are square root equations based on cylindrical geometry, but each has its own coefficient that results in slightly different results, (See Oil and Gas Journal, Van Poollen, 1964).
- C Use of the appropriate time is necessary to obtain a useful value of r_i . For a falloff time shorter than the injection period, use Agarwal equivalent time function, τ_e , at the end of the falloff as the length of the injection period preceding the shut-in to calculate r_i .
- C The following two equivalent equations for calculating r_i were taken from SPE Monograph 1, (Equation 11.2) and Well Testing by Lee (Equation 1.47), respectively:

$$r_i = \sqrt{0.00105 \frac{k \cdot t}{f \cdot m \cdot c_t}} \equiv \sqrt{\frac{k \cdot t}{948 \cdot f \cdot m \cdot c_t}}$$

Effective Wellbore Radius

- C The effective wellbore radius relates the wellbore radius and skin factor to show the effects of skin on wellbore size and consequently, injectivity.
 - C The effective wellbore radius is calculated from the following:
- $$r_{wa} = r_w e^{-s}$$
- C A negative skin will result in a larger effective wellbore radius and therefore a lower injection pressure.

Reservoir Injection Pressure Corrected for Skin Effects

- C The pressure correction for wellbore skin effects, ΔP_{skin} , is calculated by the following:
- $$\Delta P_{skin} = 0.868 \cdot m \cdot s$$
- where, m = slope of the semilog straight line, psi/cycle
 s = wellbore skin, dimensionless
- C The adjusted injection pressure, P_{wfa} is calculated by subtracting the ΔP_{skin} from the measured injection pressure prior to shut-in, P_{wf} . This adjusted pressure is the calculated reservoir pressure prior to shutting in the well, $\tau = 0$, and is determined by the following:

$$P_{wfa} = P_{wf} - \Delta P_{skin}$$

- C From the previous equations, it can be seen that the adjusted bottomhole pressure is directly dependent on a single point, the last injection pressure recorded prior to shut-in. Therefore, an accurate recording of this pressure prior to shut-in is important. Anything that impacts the pressure response, e.g., rate change, near the shut-in of the well should be avoided.

Determination of the Appropriate Fluid Viscosity

- C If the wastestream and formation fluid have similar viscosities, this process is not necessary.
- C This is only needed in cases where the mobility ratios are extreme between the wastestream, (k/μ)_w, and formation fluid, (k/μ)_f. Depending on when the test reaches radial flow, these cases with extreme mobility differences could cause the derivative curve to change and level to another value. Eliminating alternative geologic causes, such as a sealing fault, multiple layers, dual porosity, etc., leads to the interpretation that this change may represent the boundary of the two fluid banks.
- C First assume that the pressure transients were propagating through the formation fluid during the radial flow portion of the test, and then verify if this assumption is correct. This is generally a good strategy except for a few facilities with exceptionally long injection histories, and consequently, large waste plumes. The time for the pressure transient to exit the waste front is calculated. This time is then identified on both the log-log and semilog plots. The radial flow period is then compared to this time.
- C The radial distance to the waste front can then be estimated volumetrically using the following equation:

$$r_{waste\ plume} = \sqrt{\frac{0.13368 \cdot V_{waste\ injected}}{p \cdot h \cdot f}}$$

where, $V_{waste\ injected}$ = cumulative waste injected into the completed interval, gal
 $r_{waste\ plume}$ = estimated distance to waste front, ft
 h = interval thickness, ft
 N = porosity, fraction

- C The time necessary for a pressure transient to exit the waste front can be calculated using the following equation:

$$t_w = \frac{126.73 \cdot m_w \cdot c_t \cdot V_{waste\ injected}}{p \cdot k \cdot h}$$

where, t_w = time to exit waste front, hrs
 $V_{waste\ injected}$ = cumulative waste injected into the completed interval, gal
 h = interval thickness, ft

k = permeability, md

μ_w = viscosity of the historic waste plume at reservoir conditions, cp

c_t = total system compressibility, psi⁻¹

- C The time should be plotted on both the log-log and semilog plots to see if this time corresponds to any changes in the derivative curve or semilog pressure plot. If the time estimated to exit the waste front occurs before the start of radial flow, the assumption that the pressure transients were propagating through the reservoir fluid during the radial flow period was correct. Therefore, the viscosity of the reservoir fluid is the appropriate viscosity to use in analyzing the well test. If not, the viscosity of the historic waste plume should be used in the calculations. If the mobility ratio is extreme between the wastestream and formation fluid, adequate information should be included in the report to verify the appropriate fluid viscosity was utilized in the analysis.

Reservoir Thickness

- C The thickness used for determination of the permeability should be justified by the operator. The net thickness of the defined injection interval is not always appropriate.
- C The permeability value is necessary for plume modeling, but the transmissibility value, kh/μ , can be used to calculate the pressure buildup in the reservoir without specifying values for each parameter value of k , h , and μ .
- C Selecting an interval thickness is dependent on several factors such as whether or not the injection interval is composed of hydraulically isolated units or a single massive unit and wellbore conditions such as the depth to wellbore fill. When hydraulically isolated sands are present, it may be helpful to define the amount of injection entering each interval by conducting a flow profile survey. Temperature logs can also be reviewed to evaluate the intervals receiving fluid. Cross-sections may provide a quick look at the continuity of the injection interval around the injection well.
- C A copy of a SP/Gamma Ray well log over the injection interval, the depth to any fill, and the log and interpretation of available flow profile surveys run should be submitted with the falloff test to verify the reservoir thickness value assumed for the permeability calculation.

Use of Computer Software

- C To analyze falloff tests, operators are encouraged to use well testing software. Most software has type curve matching capabilities. This feature allows the simulation of the entire falloff test results to the acquired pressure data. This type of analysis is particularly useful in the recognition of boundaries, or unusual reservoir characteristics, such as dual porosity. It should be noted that type curve matching is not considered a substitute, but is a compliment to the analysis.
- C All data should be submitted electronically with a label stating the name of the facility, the well number(s), and the date of the test(s). The label or READ.Me file should include

the names of all the files contained on the diskette, along with any necessary explanations of the information. The parameter units format (hh:mm:ss, hours, etc.) should be noted for the pressure file for synchronization to the submitted injection rate information. The file containing the gauge data analyzed in the report should be identified and consistent with the hard copy data included in the report. If the injection rate information for any well included in the analysis is greater than 10 entries, it should also be included electronically.

Common Sense Check

- C After analyzing any test, always look at the results to see if they “make sense” based on the type of formation tested, known geology, previous test results, etc. Operators are ultimately responsible for conducting an analyzable test and the data submitted to the regulatory agency.
- C If boundary conditions are observed on the test, review cross-sections or structure maps to confirm if the presence of a boundary is feasible. If so, the boundary should be considered in the AOR pressure buildup evaluation for the well.
- C Anomalous data responses may be observed on the falloff test analysis. These data anomalies should be evaluated and explained. The analyst should investigate physical causes in addition to potential reservoir responses. These may include those relating to the well equipment, such as a leaking valve, or a channel, and those relating to the data acquisition hardware such as a faulty gauge. An anomalous response can often be traced to a brief, but significant rate change in either the test well or an offset well.
- C Anomalous data trends have also been caused by such things as ambient temperature changes in surface gauges or a faulty pressure gauge. Explanations for data trends may be facilitated through an examination of the backup pressure gauge data, or the temperature data. It is often helpful to qualitatively examine the pressure and/or temperature channels from both gauges. The pressure data should overlay during the falloff after being corrected for the difference in gauge depths. On occasion, abrupt temperature changes can be seen to correspond to trends in the pressure data. Although the source of the temperature changes may remain unexplainable, the apparent correlation of the temperature anomaly to the pressure anomaly can be sufficient reason to question the validity of the test and eliminate it from further analysis.
- C The data that is obtained from pressure transient testing should not collect dust, but be compared to petition or permit parameters. Test derived transmissibilities and static pressures can confirm compliance with no migration and non-endangerment (AOR) conditions.